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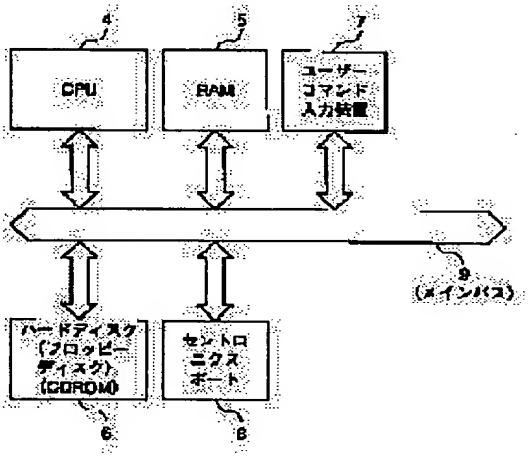
(54) PRINTING SYSTEM AND PRINTING CONTROL METHOD

(57)Abstract:
PROBLEM TO BE SOLVED: To eliminate useless printing and to dissolve the waste of paper and toner by immediately interrupting or stopping a printing processing when an operator instructs the interruption or stoppage of printing.
SOLUTION: A personal computer is provided with a user command input device 7 for inputting a command for instructing the interruption/restart of the printing processing and the cancellation of printing data to a laser printer and a centronics port 8 for immediately transmitting an input command to the printer. Then, the laser printer is provided with a CPU for completing the printing processing of a pertinent page during printing processing execution and interrupting the printing processing of the next page when a received command is an interruption command, restarting the printing processing during the interruption in the case of a restart command and cancelling all the unprinted printing data inside the printer in the case of a cancellation command.



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CLAIMS

[Claim(s)]
[Claim 1] In the printing system equipped with the host computer which has the function to transmit printing data, and the printer which has the function to print the printing data received from this host computer for every page An input means for said host computer to input the command which directs interruption of printing processing, a restart, or destruction of printing data to said printer, A transmitting means to transmit immediately the command inputted through this input means to said printer is provided. Said printer A distinction means to distinguish the class of command received from said host computer, When a receiving command is distinguished from an interruption directive command by this distinction means, while making printing processing of the applicable page under printing processing activation complete When the printing processing under interruption [interrupt printing processing of the following page, and] when a receiving command is distinguished from a restart directive command is made to resume and a receiving command is distinguished from a destruction directive command, all the printing data that are not printed in the printer concerned are canceled. The printing system characterized by providing the control means with which a new printing instruction is equipped.
[Claim 2] It is the printing system characterized by transmitting said transmitting means in said printing system according to claim 1 using an electromagnetic wave.
[Claim 3] It is the printing system which sets to said printing system according to claim 1, and is characterized by transmitting said transmitting means through lines other than the line used for the usual printing data transfer between said host computers and said printers.
[Claim 4] It is the printing system which sets to said printing system according to claim 1, and is characterized by transmitting said transmitting means using the intact control cutting tool of the Centronics line who uses for the usual printing data transfer between said host computers and said printers.
[Claim 5] It is the printing system which sets to said printing system according to claim 1, and is characterized by for said transmitting means setting up a logical channel on the physical channel of the data byte of the Centronics line used for the usual printing data transfer between said host computers and said printers, and transmitting said command on said logical channel.
[Claim 6] Said printer is a printing system characterized by having the function which can receive said command from said host computer even when printing data storage is in a full condition in said printing system according to claim 1.
[Claim 7] In the printing control approach of a printer of having the function to print the printing data received from the host computer which has the function to transmit printing data for every page The stroke which inputs the command which directs interruption of printing processing, a restart, or destruction of printing data from said host computer to said printer, The stroke which transmits the inputted command to said printer immediately, and the stroke from which said printer distinguishes the class of command received from said host computer, The stroke which interrupts printing processing of the following page while making printing processing of the applicable page under printing processing activation complete, when a receiving command is distinguished from an interruption directive command, The printing control approach characterized by having the stroke which makes the printing processing under interruption when

a receiving command is distinguished from a restart directive command resume, and the stroke which cancels all the printing data that are not printed in said printer when a receiving command is distinguished from a destruction directive command.

[Claim 8] It is the printing control approach characterized by the stroke immediately transmitted to said printer performing said inputted command in said printing control approach according to claim 7 using an electromagnetic wave.

[Claim 9] The stroke which transmits said inputted command to said printer immediately in said printing control approach according to claim 7 is the printing control approach characterized by carrying out through lines other than the line which uses for the usual printing data transfer between said host computers and said printers.

[Claim 10] The stroke which transmits said inputted command to said printer immediately in said printing control approach according to claim 7 is the printing control approach characterized by carrying out using the intact control cutting tool of the Centronics line who uses for the usual printing data transfer between said host computers and said printers.

[Claim 11] The stroke which transmits said inputted command to said printer immediately in said printing control approach according to claim 7 is the printing control approach characterized by transmitting said command on the logical channel set up on the physical channel of the data byte of the Centronics line which uses for the usual printing data transfer between said host computers and said printers.

[Claim 12] The printing control approach characterized by having the stroke which can receive said command from said host computer in said printing control approach according to claim 7 even when the printing data storage of said printer is in a full condition.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to a printing system and the printing control approach, and when canceling the futility of a form or a toner by losing useless printing especially, it relates to a suitable printing system and the printing control approach.
[0002]
[Description of the Prior Art] Conventionally, there is a printing system equipped with the printer which prints and outputs the printing data which received printing data from the host computer which can be transmitted to a printer, and the host computer concerned for every page. In this kind of printing system, although printing data will not be sent out from a host computer after printing interruption directions to a printer if an operator inputs printing interruption directions from the keyboard of a host computer etc., the printout of the printing data which the printer has already received from the host computer is carried out from a printer before printing interruption directions.
[0003]
[Problem(s) to be Solved by the Invention] However, in the conventional printing system, as mentioned above, when an operator performed printing interruption directions from a host computer, printing data [finishing / a printer / reception / from a host computer already] had the problem that a printout was carried out, before printing interruption directions. When having put in another way and the conventional printing system inputted interruption of printing of an operator, or directions of a termination into a host computer, while transmitting directions of an operator to the printer immediately from the host computer, when the printer received directions of printing interruption or a printing termination, processing which a paper jam does not generate immediately was performed and the function to in_which printing processing is interrupted or stopped did not have. Therefore, in the conventional printing system, useless printing was performed, consequently there was nonconformity that the futility of a form or a toner occurred.
[0004] When this invention is made in view of the point mentioned above and an operator directs interruption or a termination of printing, it aims at offering the printing system and the printing control approach which made it possible to lose useless printing and to cancel the futility of a form or a toner etc. by interrupting or stopping printing processing immediately.
[0005]
[Means for Solving the Problem] In order to attain the above-mentioned object, invention of claim 1 In the printing system equipped with the host computer which has the function to transmit printing data, and the printer which has the function to print the printing data received from this host computer for every page An input means for said host computer to input the command which directs interruption of printing processing, a restart, or destruction of printing data to said printer, A transmitting means to transmit immediately the command inputted through this input means to said printer is provided. Said printer A distinction means to distinguish the class of command received from said host computer, When a receiving command is distinguished from an interruption directive command by this distinction means, while making printing processing of the applicable page under printing processing activation complete When the

printing processing under interruption [interrupt printing processing of the following page, and] when a receiving command is distinguished from a restart directive command is made to resume and a receiving command is distinguished from a destruction directive command, all the printing data that are not printed in the printer concerned are canceled. It is characterized by providing the control means with which a new printing instruction is equipped.

[0006] In order to attain the above-mentioned object, invention of claim 2 is characterized by transmitting said transmitting means using an electromagnetic wave in said printing system according to claim 1.

[0007] In order to attain the above-mentioned object, invention of claim 3 is set to said printing system according to claim 1, and said transmitting means is characterized by transmitting through lines other than the line used for the usual printing data transfer between said host computers and said printers.

[0008] In order to attain the above-mentioned object, invention of claim 4 is set to said printing system according to claim 1, and said transmitting means is characterized by transmitting using the intact control cutting tool of the Centronics line who uses for the usual printing data transfer between said host computers and said printers.

[0009] In order to attain the above-mentioned object, it sets to said printing system according to claim 1, said transmitting means sets up a logical channel on the physical channel of the data byte of the Centronics line used for the usual printing data transfer between said host computers and said printers, and invention of claim 5 is characterized by transmitting said command on said logical channel.

[0010] In order to attain the above-mentioned object, it is characterized by invention of claim 6 having the function which said printer can receive [of said host computer to said command] even when printing data storage is in a full condition in said printing system according to claim 1.

[0011] In order to attain the above-mentioned object, invention of claim 7 In the printing control approach of a printer of having the function to print the printing data received from the host computer which has the function to transmit printing data for every page The stroke which inputs the command which directs interruption of printing processing, a restart, or destruction of printing data from said host computer to said printer, The stroke which transmits the inputted command to said printer immediately, and the stroke from which said printer distinguishes the class of command received from said host computer, The stroke which interrupts printing processing of the following page while making printing processing of the applicable page under printing processing activation complete, when a receiving command is distinguished from an interruption directive command, It is characterized by having the stroke which makes the printing processing under interruption when a receiving command is distinguished from a restart directive command resume, and the stroke which cancels all the printing data that are not printed in said printer when a receiving command is distinguished from a destruction directive command.

[0012] In order to attain the above-mentioned object, the stroke in which invention of claim 8 transmits said inputted command to said printer immediately in said printing control approach according to claim 7 is characterized by carrying out using an electromagnetic wave.

[0013] In order to attain the above-mentioned object, invention of claim 9 is characterized by performing the stroke which transmits said inputted command to said printer immediately through lines other than the line used for the usual printing data transfer between said host computers and said printers in said printing control approach according to claim 7.

[0014] In order to attain the above-mentioned object, invention of claim 10 is characterized by performing the stroke which transmits said inputted command to said printer immediately using the intact control cutting tool of the Centronics line who uses for the usual printing data transfer between said host computers and said printers in said printing control approach according to claim 7.

[0015] In order to attain the above-mentioned object, invention of claim 11 is characterized by the stroke which transmits said inputted command to said printer immediately transmitting said command on the logical channel set up on the physical channel of the data byte of the Centronics line used for the usual printing data transfer between said host computers and said

printers in said printing control approach according to claim 7.
[0016] In order to attain the above-mentioned object, invention of claim 12 is characterized by having the stroke which can receive said command from said host computer in said printing control approach according to claim 7, even when the printing data storage of said printer is in a full condition.
[0017]
[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained with reference to a drawing.
[0018] (1) If the whole printing system configuration concerning the gestalt of gestalt point ** of the 1st operation and the 1st operation is explained based on drawing 3 , this printing system has composition equipped with the personal computer 1 as a host computer, and the laser beam printer 3 as a printer connected to this personal computer 1 through the Centronics line 2 (path cord corresponding to [for printers] a 24-bit parallel interface).
[0019] In addition, although the laser beam printer is raised with the gestalt of the gestalt of the 1st operation and the 2nd thru/or the 4th operation mentioned later to the example as a printer, it is possible to use the printer by the method of the arbitration of a non impact type (an electrophotography type, a hot printing type, a sensible-heat type, an ink jet type, an electrostatic type, discharge-breakdown type) or the impact types (dot impact type) as a printer.

[0020] Next, if the internal configuration of the personal computer 1 of the printing system concerning the gestalt of the 1st operation is explained based on drawing 1 , the personal computer 1 has composition equipped with CPU (central processing unit)4, RAM (at-any-time write-in read-out memory)5, a hard disk 6, the user command input device 7, the Centronics port 8, and Maine Bath 9.
[0021] If the configuration of each part of the above is explained in full detail, CPU4 will control each part of a personal computer based on a program. RAM5 is used as a work area. A hard disk 6 may store a program and a floppy disk, CDROM (Compact Disc ROM), MO, etc. may be used for it instead of a hard disk 6. The user command input unit 7 is for an operator to input commands, such as printing demand instruction / printing stop instruction, a printing termination order, and a resumption instruction of printing, and specifically consists of a mouse, a keyboard, etc. The Centronics port 8 outputs an instruction, a control channel initiation recognition signal, control channel termination printing data, various recognition signals, etc. to a laser beam printer 3 through the Centronics line 2. Maine Bath 9 is a common signalling channel.
[0022] Moreover, if the internal configuration of the laser beam printer 3 of the printing system concerning the gestalt of the 1st operation is explained based on drawing 2 , the laser beam printer 3 has composition equipped with CPU10, RAM11 and ROM12, the Centronics port 13, the paper transport device 14, imprint equipment 15, and Maine Bath 16.
[0023] If the configuration of each part of the above is explained in full detail, CPU10 will control each part of a laser beam printer based on a program. RAM11 is used as a work area. ROM12 may store a program and a floppy disk, CDROM, a hard disk, etc. may be used for it instead of ROM12. The Centronics port 13 incorporates an instruction, a control channel initiation recognition signal, control channel termination printing data, various recognition signals, etc. from the Centronics line 2. The paper transport device 14 controls conveyance of a print form by the interior of a laser beam printer. Imprint equipment 15 controls the device in which printing actuation is performed to a print form. Maine Bath 16 is a common signalling channel.
[0024] In addition, especially with the gestalt of the 1st operation, unless it refuses, CPU4 controls RAM5, a hard disk 6, the user command input unit 7, and the Centronics port 8 by the personal computer 1 through Maine Bath 9, and CPU10 controls RAM11, ROM12, the Centronics port 13, the paper transport device 14, and imprint equipment 15 by the laser beam printer 3 through Maine Bath 15.
[0025] With the gestalt of the 1st operation, two logical channels are set up on the Centronics line 2 which connects a personal computer 1 and a laser beam printer 3, and drawing 4 is the schematic diagram showing the example. The control signal of a personal computer 1 is sent out through logical channel distribution equipment 17 to the logical channel C1 for control signal

transmission of the Centronics line 2, and is memorized by the 1st memory 19 through the logical channel judging equipment 18 of a laser beam printer 3. Moreover, the printing data of a personal computer 1 are sent out through logical channel distribution equipment 17 to the logical channel C2 for data transmission of the Centronics line 2, and are memorized by the 2nd memory 20 through the logical channel judging equipment 18 of a laser beam printer 3.
[0026] Moreover, in the gestalt of the 1st operation, the program by the side of a personal computer 1 is divided into the printing data forwarding section program and the user interrupt processing section program. Fundamentally, the send state FLG (flag) which exists on RAM5 of a personal computer 1 is rewritten, when a user interrupt processing section program receives the interruption processing from an operator, and a printing data forwarding section program performs various processings with reference to it.
[0027] Next, said printing data forwarding section program is explained based on drawing 5 . An operator creates data to print using application, after starting a printing system (step S101) (step S102). In addition, explanation is omitted in order for there to be nothing relation with the essence of this invention about the printing data origination approach. If an operator does the depression of the printing demand carbon button with which the user command input device 7 of a personal computer 1 is equipped (step S103), a printer driver will start creation of the printing data corresponding to the laser beam printer 3 which performs printing based on the printing data from application (step S104). A printer driver's termination of creation of printing data transmits printing data to printer Supra which transmits data to a laser beam printer 3 (step S106). (step S105)
[0028] Printer Supra starts transmission for the printing data of 1 byte of head from the Centronics port 8 to a laser beam printer 3 among the received printing data using the protocol of Centronics (step S107). Printer Supra sets the send state FLG which exists on RAM5 as CONTINUE (step S108). It judges that all transmission of printing data was completed when there were no printing data which should investigate whether printer Supra has printing data which should still be transmitted (step S110), and should be transmitted, a send state FLG is set to WAIT here (step S123), and this processing is ended (step S124).
[0029] On the other hand, printer Supra investigates a send state FLG, when there are non-sent out data (step S111), and when a send state FLG is CONTINUE Continue return printing data transmission to the above-mentioned step S109, and when a send state FLG is not CONTINUE It is recognized as printing stop instruction by the operator having been published, and a control channel initiation recognition signal is outputted from the Centronics port 8 to a laser beam printer 3 (step S112), and printing stop instruction is continuously outputted from the Centronics port 8 (step S113).
[0030] In addition, a control channel initiation recognition signal is 1 byte of signal, and the signal about a control-related logical channel will be transmitted until it transmits a control channel termination recognition signal after this. Moreover, the same value as 1 byte of this control channel initiation recognition signal shall not exist in printing data. When the same value as a control channel initiation recognition signal comes out by image data etc., a dummy bit is inserted in the creation time of printing data, and discernment processing of distinguishing from a control channel initiation recognition signal is performed.
[0031] Printer Supra investigates whether a send state FLG is DISCARD (step S114), when a send state FLG is DISCARD, it recognizes it as the printing termination order by the operator having been published, outputs a printing data RESET instruction from the Centronics port 8 to a laser beam printer 3 (step S120), and outputs a control channel termination recognition signal from the Centronics port 8 following it (step S121). Then, printer Supra cancels the printing data which are not sent [which is carrying out current maintenance] out (step S122), sets a send state FLG to WAIT (step S123), and ends this processing (step S124).
[0032] On the other hand, printer Supra stands by a new instruction of fixed time amount and an operator, when a send state FLG is not DISCARD (step S115). After fixed time amount, when a send state FLG is STOP, the answer of the (step S116 judges that there were not affirmation) and a user instruction input, and processes step S114 again. When a send state FLG is not STOP, the answer of the (step S116 investigates whether negative) and a send state FLG are

CONTINUE(s) (step S117).
[0033] When a send state FLG is CONTINUE, printer Supra judges that there was a resumption instruction of printing from an operator, sends out the resumption instruction of printing to a laser beam printer 3 (step S118), sends out a control channel termination recognition signal continuously (step S119), and resumes return printing data forwarding processing to the above-mentioned step S109. When a send state FLG is not CONTINUE, it is recognized as the abnormalities in the status (operating state) having occurred, and shifts to the above-mentioned step S120.
[0034] Next, actuation of the interruption processing by the side of a personal computer 1 (host computer) is explained to a detail based on drawing 6 . It is inputted from the user command input device 7 (a keyboard or mouse), and the trigger of interruption from an operator is notified to the corresponding interrupt handler. In addition, the instruction about the gestalt of this operation which an operator can notify is three, printing interruption, resumption of printing, and a printing termination.
[0035] If the interrupt by the operator occurs with the user command input unit 7 (step S201), the interruption factor is acquired (step S202), and it stores on RAM5. subsequently, the case where a send state FLG is not WAIT with reference to the send state FLG on current RAM5 (step S203) -- (-- the answer of step S203 judged it as under printing data transmission (it contains also during interruption), and negative) and current printer Supra acquired at the above-mentioned step S202 -- it interrupts and a factor is referred to.
[0036] When an interruption factor is printing interruption, the answer of the (step S204 sets affirmation) and a send state FLG as STOP (step S208), and ends this processing (step S219). When an interruption factor is resumption of printing, the answer of the (step S205 sets affirmation) and a send state FLG as CONTINUE (step S209), and ends this processing (step S214). When an interruption factor is a printing termination, the answer of the (step S206 sets affirmation) and a send state FLG as DISCARD (step S210), and ends this processing (step S219).
[0037] When a send state FLG is WAIT, it judges that the answer of the (step S203 has completed all printing data transmission by affirmation) and printer Supra, and the interrupt handler itself transmits control instruction to a laser beam printer 3. Then, a control channel initiation recognition signal is transmitted through the Centronics port 8 to a laser beam printer 3 (step S207), and the interruption factor acquired at the above-mentioned step S202 is referred to.
[0038] When an interruption factor is printing interruption, the answer of the (step S211 sends out printing stop instruction to affirmation) and a laser beam printer 3 (step S214), and performs step S218. When an interruption factor is resumption of printing, the answer of the (step S212 sends out the resumption instruction of printing to affirmation) and a laser beam printer 3 (step S215), and performs step S218. When an interruption factor is a printing termination, printing stop instruction is sent out to (step S213) and a laser beam printer 3 (step S216), a printing data RESET instruction is sent out continuously (step S217), and step S218 is performed. At step S218, a control channel termination recognition signal is sent out to a laser beam printer 3, and this processing is ended (step S219).
[0039] Next, actuation of the program of Maine by the side of a laser beam printer 3 (printer) is explained based on drawing 7 . In a laser beam printer 3 side, printing processings (printing control, rasterizing, paper transfer control, etc.) are performed by the program of Maine, and an interrupt handler performs data reception from a personal computer 1 through the Centronics port 13. It opts for the processing which a main program should perform with reference to the printing status fundamentally. Moreover, an interrupt handler notifies the instruction received from the personal computer 1 to a main program by updating the printing status.
[0040] If a power source is switched on (step S301), a laser beam printer 3 will start processing, will initialize the laser beam printer concerned itself (step S302), and will set the printing status on RAM11 as printing activation (step S303). Subsequently, it investigates whether the printing data which should be printed in the 2nd memory 20 (refer to drawing 4) which is a printing data storage field on RAM11 are stored (step S304). When there are no data which should be printed,

step S304 is performed again.
[0041] When there are data which should be printed, the printing status on RAM11 investigates whether it is printing activation (step S305). When the printing status is printing activation, printing processing of a page in which a degree should be printed is performed (step S306). And when the delivery of the paper which the page concerned printed is completed normally, the printing data on the 2nd memory 20 on (step S307) and RAM11 which ended printing processing are deleted (step S308), and step S304 is performed again.
[0042] In the above-mentioned step S305, when the printing status is not printing activation, it investigates whether the printing status is printing reset (step S309). When the printing status is printing reset, all the data in the 2nd memory 20 which is a printing data storage field on RAM11 are canceled (step S310). And after initializing a laser beam printer 3 (step S311) and completing initialization, the printing status is set as activation (step S312), and step S304 is performed again.
[0043] In the above-mentioned step S309, when the printing status is not printing reset, the printing status investigates whether it is printing interruption (step S313). When the printing status is printing interruption, step S305 is performed that the following user command should be acquired. When the printing status is not printing interruption, it judges that the status is unusual, all the data in the 2nd memory 20 which is a printing data storage field on RAM11 are canceled, and a laser beam printer 3 is initialized (step S314). After initialization is completed, the printing status is set as activation (step S315), and step S304 is performed again.
[0044] Next, actuation of the interrupt handler of a laser beam printer 3 (printer) is explained based on drawing 8 . An interrupt handler is started at the time of completion of initialization of a laser beam printer 3 (step S401), and stands by interruption from a personal computer 1 (host computer) (step S402). Generating of interruption investigates whether nSTROB of the Centronics line 2 was turned off through the Centronics port 13 (step S403).
[0045] When not turned off, processing corresponding to each interruption is performed (step S405). When turned off, BUSY of the Centronics line 2 is set to HIGH through the Centronics port 13 (step S404), the further interruption from a personal computer 1 is refused, and data are incorporated from the DATA line of the Centronics line 2 through the Centronics port 13 (step S406). And the data concerned judge whether it is data of a control channel (step S407). In this case, it judges by whether it is data of the section when data were sandwiched by the control channel initiation identifier and the termination identifier.
[0046] When the incorporated data are not data of a control channel, it is judged as the usual printing data and stores in the 2nd memory 20 on RAM11 (step S408). And it investigates whether there is any opening which can still store printing data in the 2nd memory 20 (step S409). When there is no opening in the 2nd memory 20, fixed time amount standby is carried out and step S409 is performed again. When an opening is in the 2nd memory 20, BUSY of the Centronics line 2 is set to LOW (step S410), and the purport in which interruption reception of the degree from a personal computer 1 is possible is notified to the computer 1 concerned. Then, nACK of the Centronics line 2 is transmitted through the Centronics port 13 (step S411), 1 byte of data reception completion is notified, and step S402 is performed again that the following data should be received.
[0047] On the other hand, when the incorporated data are data of a control channel, it is judged as the data of control instruction and stores in the 1st memory 19 (refer to drawing 4) on RAM11 (step S412). And it investigates whether there is any opening which can still store control instruction data in the 1st memory 19 (step S413). When there is no opening in the 1st memory 19, fixed time amount standby is carried out and step S413 is performed again. When an opening is in the 1st memory 19, BUSY of the Centronics line 2 is set to LOW (step S414), and the purport in which interruption reception of the degree from a personal computer 1 is possible is notified to the computer 1 concerned. Then, nACK of the Centronics line 2 is transmitted through the Centronics port 13, and 1 byte of data reception completion is notified (step S415).
[0048] It investigates whether the control instruction stored in the 1st memory 19 is printing stop instruction after advice of data reception completion (step S416). When control instruction is printing stop instruction, the printing status is set as printing interruption that it should notify

to Maine (step S417), the printing stop instruction of the 1st memory 19 is cleared after setting-out termination (step S423), and step S402 is performed.
[0049] In the above-mentioned step S416, when the control instruction stored in the 1st memory 19 is not printing stop instruction, it investigates whether the control instruction stored in the 1st memory 19 is a printing RESET instruction (step S418). When control instruction is a printing RESET instruction, the printing status is set as Printing RESET that it should notify to Maine (step S419), the printing RESET instruction of the 1st memory 19 is cleared after setting-out termination (step S423), and step S402 is performed.
[0050] In the above-mentioned step S416, when the control instruction stored in the 1st memory 19 is not a printing RESET instruction, it investigates whether the control instruction stored in the 1st memory 19 is a resumption instruction of printing (step S420). When control instruction is a resumption instruction of printing, the printing status is set as resumption of printing that it should notify to Maine (step S421), the resumption instruction of printing of the 1st memory 19 is cleared after setting-out termination (step S423), and step S402 is performed.
[0051] In the above-mentioned step S416, when the control instruction stored in the 1st memory 19 is not a resumption instruction of printing, it is recognized as the abnormalities in the status having occurred, the printing status is set as Printing RESET (step S422), and step S402 is performed after setting-out termination.
[0052] As mentioned above, since the operator of a printing system can interrupt or stop printing processing of a laser beam printer 3 immediately when he directs interruption or a termination of printing to a laser beam printer 3 through the user command input unit 7 of a personal computer 1, while not performing useless printing and being able to cancel the futility of a form or a toner, according to the gestalt of the 1st operation, release of a laser beam printer 3 also becomes possible immediately. Moreover, a personal computer 1 and a laser beam printer 3 have the advantage that it is not necessary to add new hardware, by adopting the approach by the gestalt of the 1st operation. Moreover, it is possible to also realize port setting out of the hardware to be used in the conventional state.
[0053] (2) Replace the gestalt of operation of the gestalt 2nd of the 2nd operation with the approach of sending out control command in the gestalt of implementation of the above 1st using the data line of the Centronics line 2, and it notifies printing stop instruction, the resumption instruction of printing, and a printing termination order to a laser beam printer 3 using the intact BIT number (5-7) of the control line of the Centronics line 2. Since it is the same as that of each bit control approach in nSTROB of the Centronics line 2 etc., the control approach of the control lines 5-BIT 7 is omitted for details.
[0054] Drawing 9 is drawing showing two examples of a definition of the control instruction of the control cutting tool of the Centronics control. Example 1 — a printing interruption instruction — in ON and the resumption instruction of printing, ON and a printing termination order set [BIT5] BIT7 to ON for BIT6. moreover — Example 2 — a printing interruption instruction — ON and a printing termination order carry out [BIT /5 / instruction / OFF (when BIT5 is always turned off during interruption and it is turned on, unless a laser beam printer 3 has a printing termination order, it is recognized as interruption instruction discharge), and / of printing / resumption] BIT6 as ON in BIT5. In addition, a printing termination order also has the approach for which nINIT of a control line is substituted.
[0055] The signal of a pulse condition is sent out by setting the control signal sending-out approach of each instruction for a laser beam printer 3 to HIGH from a personal computer 1 to each bit (DEFAULT level OFF) in the gestalt of the 2nd operation, and carrying out after [OFF] fixed time amount. Since the detail of the system configuration concerning the gestalt of the 2nd operation, an internal-block configuration, and actuation is almost the same as the gestalt of implementation of the above 1st, only a difference is explained below.
[0056] With the gestalt of the 2nd operation, since there is no need of setting up a logical channel in order to use a control line, sending-out" becomes unnecessary about a control channel termination identifier to sending-out" and "laser beam printer to "laser beam printer of operation applied to steps S112, S119, and S122 of drawing 5 R> 5, and steps S207 and S218 of drawing 6 among the actuation in a personal computer 1 in a control channel initiation identifier.

[0057] Moreover, with the gestalt of the 2nd operation, in a laser beam printer 3 side, when it interrupts, the controller is monitoring the condition of the control lines 5-BIT 7 continuously and the condition of a signal line has change, it is made the trigger and an interrupt handler is operated.
[0058] Moreover, in order that control instruction may use another line physically [printing data] with the gestalt of the 2nd operation, From step S412 of drawing 8 to the step S415 is unnecessary among actuation of the interrupt handler of a laser beam printer 3. "It judges whether BIT 5-7 of a control line had change" before step S403, when a judgment result is yes, step S416 is performed, and when a judgment result is no, step S403 is performed.
[0059] As mentioned above, according to the gestalt of the 2nd operation, generate possibility that port setting out of the hardware used as compared with the gestalt of implementation of the above 1st must be changed, but Since the driver DLL which controls only BIT 5-7 of a control line is created independently and it can realize, modification to the data forwarding program using conventional Centronics As compared with the gestalt of implementation of the above 1st, it is few, and ends, and, thereby, the time amount which development takes can be shortened. Moreover, even when a laser beam printer 3 cannot receive printing data in the state of memory full, the interruption and the termination of printing processing in a laser beam printer 3 are possible.
[0060] (3) If the whole printing system configuration concerning the gestalt of gestalt point ** of the 3rd operation and the 3rd operation is explained based on drawing 12 , this printing system has composition equipped with the personal computer 21 as a host computer, and the laser beam printer 23 as a printer connected to this personal computer 21 through Centronics line 22a and control-line 22b.
[0061] Next, if the internal configuration of the personal computer 21 of the printing system concerning the gestalt of the 3rd operation is explained based on drawing 10 , the personal computer 21 has composition equipped with CPU24, RAM25, a hard disk 26, the user command input device 27, the Centronics port 28, control signal sending-out equipment 29, and Maine Bath 30.
[0062] If the configuration of each part of the above is explained in full detail, CPU24 will control each part of a personal computer based on a program. RAM25 is used as a work area. A hard disk 26 may store a program and a floppy disk, CDROM, etc. may be used for it instead of a hard disk 26. The user command input unit 27 is for an operator to input various commands, and specifically consists of a mouse, a keyboard, etc. The Centronics port 28 outputs printing data etc. to a laser beam printer 23 through Centronics line 22a. Control signal sending-out equipment 29 outputs a control signal to a laser beam printer 23 through control-line 22b. Maine Bath 30 is a common signalling channel.
[0063] Moreover, if the internal configuration of the laser beam printer 23 of the printing system concerning the gestalt of the 3rd operation is explained based on drawing 11 , the laser beam printer 23 has composition equipped with CPU31, RAM32 and ROM33, the Centronics port 34, the paper transport device 35, imprint equipment 36, the electromagnetic wave signal receiving set 37, and Maine Bath 38.
[0064] If the configuration of each part of the above is explained in full detail, CPU31 will control each part of a laser beam printer based on a program. RAM32 is used as a work area. ROM33 may store a program and a floppy disk, CDROM, a hard disk, etc. may be used for it instead of ROM33. The Centronics port 34 incorporates printing data from Centronics line 22a. The paper transport device 35 controls conveyance of a print form by the interior of a laser beam printer. Imprint equipment 36 controls the device in which printing actuation is performed to a print form. The electromagnetic wave signal receiving set 37 receives an electromagnetic wave signal from control-line 22b. Maine Bath 38 is a common signalling channel.
[0065] In addition, especially with the gestalt of the 3rd operation, unless it refuses, CPU24 controls RAM25, a hard disk 26, the user command input unit 27, the Centronics port 28, and control signal sending-out equipment 29 by the personal computer 21 through Maine Bath 30, and CPU31 controls RAM32, ROM33, the Centronics port 34, the paper transport device 35, imprint equipment 36, and the electromagnetic wave signal receiving set 37 by the laser beam

printer 23 through Maine Bath 38.
[0066] Actuation of the printing system concerning the gestalt of the 3rd operation is the same as that of the printing system concerning the gestalt of implementation of the above 2nd almost, and in order that only the sending-out approach of control instruction may carry out difference, only a difference is explained below.
[0067] In a personal computer 21 side, the class (printing stop instruction, the resumption instruction of printing, printing RESET instruction) of a send statement and the instruction concerned is sent out to control signal sending-out equipment 29 at the time of generating of a control instruction sending-out demand. The control signal sending-out equipment 29 which received the control instruction sending-out demand sends out the demanded control instruction. The three following approaches can be considered as the sending-out approach of control instruction.
[0068] (i) Three or more physical lines for signal transduction to a laser beam printer 23 and a personal computer 21 are at a certain time. In this case, it is the approach define each instruction and a physical line by the same definition approach as the definition approach of an instruction of having used BIT 5-7 of the control line of Example 1 of drawing 9 , and control signal sending-out equipment 29 sends out an instruction according to that definition.
[0069] (ii) Two or more physical lines for signal transduction to a laser beam printer 23 and a personal computer 21 are at a certain time. In this case, it is the approach define each instruction and a physical line by the same definition approach as the definition approach of an instruction of having used BIT 5-6 of the control line of Example 2 of drawing 9 , and control signal sending-out equipment 29 sends out an instruction according to that definition.
[0070] (iii) One or more lines by which the synchronizing signal for taking the synchronization at the time of the physical line for signal transduction performing 1 or more and signal transduction in a laser beam printer 23 and a personal computer 21 is flowing are at a certain time. Drawing 13 is the example of a definition of the signal at that time, and each instruction. In this case, control signal sending-out equipment 29 has always sent out the synchronizing signal.
[0071] In the laser beam printer 23 side, the electromagnetic wave signal receiving set 37 received the synchronizing signal sent out from the control signal sending-out equipment 29 of a personal computer 21, and has always taken control signal sending-out equipment 29 and a synchronization. And when the level of control signal line 22b has change, according to the definition of drawing 13 , it analyzes whether it is which control instruction from the level change, and the analysis result is reflected in the printing status.
[0072] As mentioned above, since advice of control instruction can be performed even if it does not use the Centronics port, according to the gestalt of the 3rd operation, it has the advantage that there is no need of changing the driver which operates the port of Centronics. Moreover, even when a laser beam printer 23 cannot receive printing data in the state of memory full, interruption or a termination of printing processing of a laser beam printer 23 is possible.
[0073] (4) If the whole printing system configuration concerning the gestalt of gestalt point ** of the 4th operation and the 4th operation is explained based on drawing 16 , this printing system has composition equipped with the personal computer 41 as a host computer, and the laser beam printer 42 as a printer with which wireless is transmitted from this personal computer 41.
[0074] Next, if the internal configuration of the personal computer 41 of the printing system concerning the gestalt of the 4th operation is explained based on drawing 14 , the personal computer 41 has composition equipped with CPU43, RAM44, a hard disk 45, the user command input device 46, the Centronics port 47, the electromagnetic wave signal launcher 48, and Maine Bath 49.
[0075] If the configuration of each part of the above is explained in full detail, CPU43 will control each part of a personal computer based on a program. RAM44 is used as a work area. A hard disk 45 may store a program and a floppy disk, CDROM, etc. may be used for it instead of a hard disk 45. The user command input unit 46 is for an operator to input various commands, and specifically consists of a mouse, a keyboard, etc. The Centronics port 47 outputs printing data etc. The electromagnetic wave signal launcher 48 discharges an electromagnetic wave signal to a laser beam printer 42. Maine Bath 30 is a common signalling channel.

[0076] Moreover, if the internal configuration of the laser beam printer 42 of the printing system concerning the gestalt of the 4th operation is explained based on drawing 15 , the laser beam printer 42 has composition equipped with CPU50, RAM51 and ROM52, the Centronics port 53, the paper transport device 54, imprint equipment 55, the control signal receiving set 56, and Maine Bath 57.
[0077] If the configuration of each part of the above is explained in full detail, CPU50 will control each part of a laser beam printer based on a program. RAM51 is used as a work area. ROM52 may store a program and a floppy disk, CDROM, a hard disk, etc. may be used for it instead of ROM52. The Centronics port 53 incorporates printing data etc. The paper transport device 54 controls conveyance of a print form by the interior of a laser beam printer. Imprint equipment 55 controls the device in which printing actuation is performed to a print form. The control signal receiving set 56 receives a control signal. Maine Bath 57 is a common signalling channel.
[0078] In addition, especially with the gestalt of the 4th operation, unless it refuses, CPU43 controls RAM44, a hard disk 45, the user command input unit 46, the Centronics port 47, and the electromagnetic wave signal launcher 48 by the personal computer 41 through Maine Bath 49, and CPU50 controls RAM51, ROM52, the Centronics port 53, the paper transport device 54, imprint equipment 55, and the control signal receiving set 56 by the laser beam printer 42 through Maine Bath 57.
[0079] The detail of operation of the gestalt of the 4th operation is the same as the gestalt of implementation of the above 3rd almost, and only the sending-out approach of control instruction carries out difference. Although the approach of notifying to a laser beam printer from a personal computer using a physical line was taken with the gestalt of implementation of the above 3rd, the approach of notifying to a laser beam printer 42 from a personal computer 41 using an electromagnetic wave is taken with the gestalt of the 4th operation. Since the discharge approach of an electromagnetic wave and the reception approach of an electromagnetic wave are well-known techniques, explanation is omitted. In addition, the definition approach of a signal is the same as the approach shown in above-mentioned drawing 13 .
[0080] As mentioned above, according to the gestalt of the 4th operation, in addition to the effectiveness in the gestalt of implementation of the above 3rd, there is an advantage that constraint of the physical location relation between a laser beam printer 42 and a personal computer 41 can be made loose.
[0081] In addition, even if it applies this invention to the system which consists of two or more devices, it may be applied to the equipment which consists of one device. Moreover, it cannot be overemphasized that this invention can be applied also when attained by supplying a program to a system or equipment. In this case, that system or equipment becomes possible [enjoying the effectiveness of this invention] by reading the storage which stored the program expressed by the software for attaining this invention to this system or equipment.
[0082]
[Effect of the Invention] As explained above, according to invention of claim 1, a host computer The input means for inputting the command which directs interruption of printing processing, a restart, or destruction of printing data to a printer, A transmitting means to transmit the inputted command to a printer immediately is provided. A printer A distinction means to distinguish the class of command received from the host computer, When a receiving command is distinguished from an interruption directive command, while making printing processing of the applicable page under printing processing activation complete When the printing processing under interruption [interrupt printing processing of the following page, and] when a receiving command is distinguished from a restart directive command is made to resume and a receiving command is distinguished from a destruction directive command, all the printing data that are not printed in a printer are canceled. Since the control means with which a new printing instruction is equipped is provided, it is not necessary to perform useless printing and the futility of a form or a toner can be canceled. Moreover, while release of the printer to a host computer also becomes possible immediately, a host computer and a printer have the advantage that it is not necessary to add new hardware.
[0083] According to invention of claim 2, in a printing system according to claim 1, a transmitting

means has the advantage that constraint of the physical location relation between a printer and a host computer becomes loose while doing so the same effectiveness as invention of claim 1, in order to transmit using an electromagnetic wave.
[0084] According to invention of claim 3, it sets to a printing system according to claim 1, and a transmitting means becomes possible [transmitting the command to a printer immediately further] from a host computer while doing so the same effectiveness as invention of claim 1, in order to transmit through lines other than the line used for the usual printing data transfer between a host computer and a printer.
[0085] In order to transmit using the intact control cutting tool of the Centronics line who uses for the usual printing data transfer between a host computer and a printer, while it sets to a printing system according to claim 1 according to invention of claim 4, and a transmitting means does so the same effectiveness as invention of claim 1, modification to the data-forwarding program using Centronics becomes possible [shortening the time amount which there is, and ends and development takes]. [comparatively little]
[0086] According to invention of claim 5, it sets to a printing system according to claim 1. A transmitting means In order to set up a logical channel on the physical channel of the data byte of the Centronics line used for the usual printing data transfer between a host computer and a printer and to transmit said command on said logical channel, While doing so the same effectiveness as invention of claim 1, even if it does not use the port of Centronics, a command can be transmitted, and it becomes unnecessary that this changes the hardware which operates the port of Centronics.
[0087] According to invention of claim 6, in a printing system according to claim 1, when printing data storage is in a full condition, or when [since it has the function which can receive a command from a host computer, while doing so the same effectiveness as invention of claim 1,] a printer cannot receive printing data from a host computer, the interruption of printing processing of a printer of a printer is attained.
[0088] The stroke which inputs the command which directs interruption of printing processing, a restart, or destruction of printing data from a host computer to a printer according to invention of claim 7, The stroke which transmits the inputted command to a printer immediately, and the stroke from which a printer distinguishes the class of command received from the host computer, The stroke which interrupts printing processing of the following page while making printing processing of the applicable page under printing processing activation complete, when a receiving command is distinguished from an interruption directive command, Since it has the stroke which makes the printing processing under interruption when a receiving command is distinguished from a restart directive command resume, and the stroke which cancels all the printing data that are not printed in a printer when a receiving command is distinguished from a destruction directive command, It is not necessary to perform useless printing and the futility of a form or a toner can be canceled like invention of claim 1. Moreover, while release of the printer to a host computer also becomes possible immediately, a host computer and a printer have the advantage that it is not necessary to add new hardware.
[0089] According to invention of claim 8, in the printing control approach according to claim 7, the stroke which transmits the inputted command to a printer immediately has the advantage that constraint of the physical location relation between a printer and a host computer becomes loose while doing so the same effectiveness as invention of claim 7, in order to carry out using an electromagnetic wave.
[0090] According to invention of claim 9, in the printing control approach according to claim 7, the stroke which transmits the inputted command to a printer immediately becomes possible [transmitting the command to a printer immediately further] from a host computer while doing so the same effectiveness as invention of claim 7, in order to carry out through lines other than the line used for the usual printing data transfer between a host computer and a printer.
[0091] According to invention of claim 10, the stroke which transmits the inputted command to a printer immediately in the printing control approach according to claim 7 In order to carry out using the intact control cutting tool of the Centronics line who uses for the usual printing data transfer between a host computer and a printer, while doing so the same effectiveness as

invention of claim 7 Modification to the data forwarding program using Centronics becomes possible [shortening the time amount which there is, and ends and development takes].
[comparatively little]
[0092] According to invention of claim 11, the stroke which transmits the inputted command to a printer immediately in the printing control approach according to claim 7 In order to transmit said command on the logical channel set up on the physical channel of the data byte of the Centronics line used for the usual printing data transfer between a host computer and a printer, While doing so the same effectiveness as invention of claim 7, even if it does not use the port of Centronics, a command can be transmitted, and it becomes unnecessary that this changes the hardware which operates the port of Centronics.
[0093] According to invention of claim 12, when the printing data storage of a printer is in a full condition in the printing control approach according to claim 7, or when [since it has the stroke which can receive a command from a host computer, while doing so the same effectiveness as invention of claim 7] a printer cannot receive printing data from a host computer, interruption of printing processing of a printer is attained.

[Translation done.]

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TECHNICAL FIELD

[Field of the Invention] This invention relates to a printing system and the printing control approach, and when canceling the futility of a form or a toner by losing useless printing especially, it relates to a suitable printing system and the printing control approach.

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PRIOR ART

[Description of the Prior Art] Conventionally, there is a printing system equipped with the printer which prints and outputs the printing data which received printing data from the host computer which can be transmitted to a printer, and the host computer concerned for every page. In this kind of printing system, although printing data will not be sent out from a host computer after printing interruption directions to a printer if an operator inputs printing interruption directions from the keyboard of a host computer etc., the printout of the printing data which the printer has already received from the host computer is carried out from a printer before printing interruption directions.

[Translation done.]

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EFFECT OF THE INVENTION

[Effect of the Invention] As explained above, according to invention of claim 1, a host computer The input means for inputting the command which directs interruption of printing processing, a restart, or destruction of printing data to a printer, A transmitting means to transmit the inputted command to a printer immediately is provided. A printer A distinction means to distinguish the class of command received from the host computer, When a receiving command is distinguished from an interruption directive command, while making printing processing of the applicable page under printing processing activation complete When the printing processing under interruption [interrupt printing processing of the following page, and] when a receiving command is distinguished from a restart directive command is made to resume and a receiving command is distinguished from a destruction directive command, all the printing data that are not printed in a printer are canceled. Since the control means with which a new printing instruction is equipped is provided, it is not necessary to perform useless printing and the futility of a form or a toner can be canceled. Moreover, while release of the printer to a host computer also becomes possible immediately, a host computer and a printer have the advantage that it is not necessary to add new hardware.
[0083] According to invention of claim 2, in a printing system according to claim 1, a transmitting means has the advantage that constraint of the physical location relation between a printer and a host computer becomes loose while doing so the same effectiveness as invention of claim 1, in order to transmit using an electromagnetic wave.
[0084] According to invention of claim 3, it sets to a printing system according to claim 1, and a transmitting means becomes possible [transmitting the command to a printer immediately further] from a host computer while doing so the same effectiveness as invention of claim 1, in order to transmit through lines other than the line used for the usual printing data transfer between a host computer and a printer.
[0085] In order to transmit using the intact control cutting tool of the Centronics line who uses for the usual printing data transfer between a host computer and a printer, while it sets to a printing system according to claim 1 according to invention of claim 4, and a transmitting means does so the same effectiveness as invention of claim 1, modification to the data-forwarding program using Centronics becomes possible [shortening the time amount which there is, and ends and development takes]. [comparatively little]
[0086] According to invention of claim 5, it sets to a printing system according to claim 1. A transmitting means In order to set up a logical channel on the physical channel of the data byte of the Centronics line used for the usual printing data transfer between a host computer and a printer and to transmit said command on said logical channel, While doing so the same effectiveness as invention of claim 1, even if it does not use the port of Centronics, a command can be transmitted, and it becomes unnecessary that this changes the hardware which operates the port of Centronics.
[0087] According to invention of claim 6, in a printing system according to claim 1, when printing data storage is in a full condition, or when [since it has the function which can receive a command from a host computer, while doing so the same effectiveness as invention of claim 1,] a printer cannot receive printing data from a host computer, the interruption of printing

processing of a printer of a printer is attained.
[0088] The stroke which inputs the command which directs interruption of printing processing, a restart, or destruction of printing data from a host computer to a printer according to invention of claim 7, The stroke which transmits the inputted command to a printer immediately, and the stroke from which a printer distinguishes the class of command received from the host computer, The stroke which interrupts printing processing of the following page while making printing processing of the applicable page under printing processing activation complete, when a receiving command is distinguished from an interruption directive command, Since it has the stroke which makes the printing processing under interruption when a receiving command is distinguished from a restart directive command resume, and the stroke which cancels all the printing data that are not printed in a printer when a receiving command is distinguished from a destruction directive command, It is not necessary to perform useless printing and the futility of a form or a toner can be canceled like invention of claim 1. Moreover, while release of the printer to a host computer also becomes possible immediately, a host computer and a printer have the advantage that it is not necessary to add new hardware.
[0089] According to invention of claim 8, in the printing control approach according to claim 7, the stroke which transmits the inputted command to a printer immediately has the advantage that constraint of the physical location relation between a printer and a host computer becomes loose while doing so the same effectiveness as invention of claim 7, in order to carry out using an electromagnetic wave.
[0090] According to invention of claim 9, in the printing control approach according to claim 7, the stroke which transmits the inputted command to a printer immediately becomes possible [transmitting the command to a printer immediately further] from a host computer while doing so the same effectiveness as invention of claim 7, in order to carry out through lines other than the line used for the usual printing data transfer between a host computer and a printer.
[0091] According to invention of claim 10, the stroke which transmits the inputted command to a printer immediately in the printing control approach according to claim 7 In order to carry out using the intact control cutting tool of the Centronics line who uses for the usual printing data transfer between a host computer and a printer, while doing so the same effectiveness as invention of claim 7 Modification to the data forwarding program using Centronics becomes possible [shortening the time amount which there is, and ends and development takes].
[comparatively little]
[0092] According to invention of claim 11, the stroke which transmits the inputted command to a printer immediately in the printing control approach according to claim 7 In order to transmit said command on the logical channel set up on the physical channel of the data byte of the Centronics line used for the usual printing data transfer between a host computer and a printer, While doing so the same effectiveness as invention of claim 7, even if it does not use the port of Centronics, a command can be transmitted, and it becomes unnecessary that this changes the hardware which operates the port of Centronics.
[0093] According to invention of claim 12, when the printing data storage of a printer is in a full condition in the printing control approach according to claim 7, or when [since it has the stroke which can receive a command from a host computer, while doing so the same effectiveness as invention of claim 7] a printer cannot receive printing data from a host computer, interruption of printing processing of a printer is attained.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, in the conventional printing system, as mentioned above, when an operator performed printing interruption directions from a host computer, printing data [finishing / a printer / reception / from a host computer already] had the problem that a printout was carried out, before printing interruption directions. When having put in another way and the conventional printing system inputted interruption of printing of an operator, or directions of a termination into a host computer, while transmitting directions of an operator to the printer immediately from the host computer, when the printer received directions of printing interruption or a printing termination, processing which a paper jam does not generate immediately was performed and the function to in_which printing processing is interrupted or stopped did not have. Therefore, in the conventional printing system, useless printing was performed, consequently there was nonconformity that the futility of a form or a toner occurred. [0004] When this invention is made in view of the point mentioned above and an operator directs interruption or a termination of printing, it aims at offering the printing system and the printing control approach which made it possible to lose useless printing and to cancel the futility of a form or a toner etc. by interrupting or stopping printing processing immediately.

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MEANS

[Means for Solving the Problem] In order to attain the above-mentioned object, invention of claim 1 In the printing system equipped with the host computer which has the function to transmit printing data, and the printer which has the function to print the printing data received from this host computer for every page An input means for said host computer to input the command which directs interruption of printing processing, a restart, or destruction of printing data to said printer, A transmitting means to transmit immediately the command inputted through this input means to said printer is provided. Said printer A distinction means to distinguish the class of command received from said host computer, When a receiving command is distinguished from an interruption directive command by this distinction means, while making printing processing of the applicable page under printing processing activation complete When the printing processing under interruption [interrupt printing processing of the following page, and] when a receiving command is distinguished from a restart directive command is made to resume and a receiving command is distinguished from a destruction directive command, all the printing data that are not printed in the printer concerned are canceled. It is characterized by providing the control means with which a new printing instruction is equipped.
[0006] In order to attain the above-mentioned object, invention of claim 2 is characterized by transmitting said transmitting means using an electromagnetic wave in said printing system according to claim 1.
[0007] In order to attain the above-mentioned object, invention of claim 3 is set to said printing system according to claim 1, and said transmitting means is characterized by transmitting through lines other than the line used for the usual printing data transfer between said host computers and said printers.
[0008] In order to attain the above-mentioned object, invention of claim 4 is set to said printing system according to claim 1, and said transmitting means is characterized by transmitting using the intact control cutting tool of the Centronics line who uses for the usual printing data transfer between said host computers and said printers.
[0009] In order to attain the above-mentioned object, it sets to said printing system according to claim 1, said transmitting means sets up a logical channel on the physical channel of the data byte of the Centronics line used for the usual printing data transfer between said host computers and said printers, and invention of claim 5 is characterized by transmitting said command on said logical channel.
[0010] In order to attain the above-mentioned object, it is characterized by invention of claim 6 having the function which said printer can receive [of said host computer to said command] even when printing data storage is in a full condition in said printing system according to claim 1.

[0011] In order to attain the above-mentioned object, invention of claim 7 In the printing control approach of a printer of having the function to print the printing data received from the host computer which has the function to transmit printing data for every page The stroke which inputs the command which directs interruption of printing processing, a restart, or destruction of printing data from said host computer to said printer, The stroke which transmits the inputted command to said printer immediately, and the stroke from which said printer distinguishes the

class of command received from said host computer, The stroke which interrupts printing processing of the following page while making printing processing of the applicable page under printing processing activation complete, when a receiving command is distinguished from an interruption directive command, It is characterized by having the stroke which makes the printing processing under interruption when a receiving command is distinguished from a restart directive command resume, and the stroke which cancels all the printing data that are not printed in said printer when a receiving command is distinguished from a destruction directive command.
[0012] In order to attain the above-mentioned object, the stroke in which invention of claim 8 transmits said inputted command to said printer immediately in said printing control approach according to claim 7 is characterized by carrying out using an electromagnetic wave.
[0013] In order to attain the above-mentioned object, invention of claim 9 is characterized by performing the stroke which transmits said inputted command to said printer immediately through lines other than the line used for the usual printing data transfer between said host computers and said printers in said printing control approach according to claim 7.
[0014] In order to attain the above-mentioned object, invention of claim 10 is characterized by performing the stroke which transmits said inputted command to said printer immediately using the intact control cutting tool of the Centronics line who uses for the usual printing data transfer between said host computers and said printers in said printing control approach according to claim 7.
[0015] In order to attain the above-mentioned object, invention of claim 11 is characterized by the stroke which transmits said inputted command to said printer immediately transmitting said command on the logical channel set up on the physical channel of the data byte of the Centronics line used for the usual printing data transfer between said host computers and said printers in said printing control approach according to claim 7.
[0016] In order to attain the above-mentioned object, invention of claim 12 is characterized by having the stroke which can receive said command from said host computer in said printing control approach according to claim 7, even when the printing data storage of said printer is in a full condition.
[0017]
[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained with reference to a drawing.
[0018] (1) If the whole printing system configuration concerning the gestalt of gestalt point ** of the 1st operation and the 1st operation is explained based on drawing 3 , this printing system has composition equipped with the personal computer 1 as a host computer, and the laser beam printer 3 as a printer connected to this personal computer 1 through the Centronics line 2 (path cord corresponding to [for printers] a 24-bit parallel interface).
[0019] In addition, although the laser beam printer is raised with the gestalt of the gestalt of the 1st operation and the 2nd thru/or the 4th operation mentioned later to the example as a printer, it is possible to use the printer by the method of the arbitration of a non impact type (an electrophotography type, a hot printing type, a sensible-heat type, an ink jet type, an electrostatic type, discharge-breakdown type) or the impact types (dot impact type) as a printer.

[0020] Next, if the internal configuration of the personal computer 1 of the printing system concerning the gestalt of the 1st operation is explained based on drawing 1 , the personal computer 1 has composition equipped with CPU (central processing unit)4, RAM (at-any-time write-in read-out memory)5, a hard disk 6, the user command input device 7, the Centronics port 8, and Maine Bath 9.
[0021] If the configuration of each part of the above is explained in full detail, CPU4 will control each part of a personal computer based on a program. RAM5 is used as a work area. A hard disk 6 may store a program and a floppy disk, CDROM (Compact Disc ROM), MO, etc. may be used for it instead of a hard disk 6. The user command input unit 7 is for an operator to input commands, such as printing demand instruction / printing stop instruction, a printing termination order, and a resumption instruction of printing, and specifically consists of a mouse, a keyboard, etc. The Centronics port 8 outputs an instruction, a control channel initiation recognition signal,

control channel termination printing data, various recognition signals, etc. to a laser beam printer 3 through the Centronics line 2. Maine Bath 9 is a common signalling channel.
[0022] Moreover, if the internal configuration of the laser beam printer 3 of the printing system concerning the gestalt of the 1st operation is explained based on drawing 2 , the laser beam printer 3 has composition equipped with CPU10, RAM11 and ROM12, the Centronics port 13, the paper transport device 14, imprint equipment 15, and Maine Bath 16.
[0023] If the configuration of each part of the above is explained in full detail, CPU10 will control each part of a laser beam printer based on a program. RAM11 is used as a work area. ROM12 may store a program and a floppy disk, CDROM, a hard disk, etc. may be used for it instead of ROM12. The Centronics port 13 incorporates an instruction, a control channel initiation recognition signal, control channel termination printing data, various recognition signals, etc. from the Centronics line 2. The paper transport device 14 controls conveyance of a print form by the interior of a laser beam printer. Imprint equipment 15 controls the device in which printing actuation is performed to a print form. Maine Bath 16 is a common signalling channel.
[0024] In addition, especially with the gestalt of the 1st operation, unless it refuses, CPU4 controls RAM5, a hard disk 6, the user command input unit 7, and the Centronics port 8 by the personal computer 1 through Maine Bath 9, and CPU10 controls RAM11, ROM12, the Centronics port 13, the paper transport device 14, and imprint equipment 15 by the laser beam printer 3 through Maine Bath 15.
[0025] With the gestalt of the 1st operation, two logical channels are set up on the Centronics line 2 which connects a personal computer 1 and a laser beam printer 3, and drawing 4 is the schematic diagram showing the example. The control signal of a personal computer 1 is sent out through logical channel distribution equipment 17 to the logical channel C1 for control signal transmission of the Centronics line 2, and is memorized by the 1st memory 19 through the logical channel judging equipment 18 of a laser beam printer 3. Moreover, the printing data of a personal computer 1 are sent out through logical channel distribution equipment 17 to the logical channel C2 for data transmission of the Centronics line 2, and are memorized by the 2nd memory 20 through the logical channel judging equipment 18 of a laser beam printer 3.
[0026] Moreover, in the gestalt of the 1st operation, the program by the side of a personal computer 1 is divided into the printing data forwarding section program and the user interrupt processing section program. Fundamentally, the send state FLG (flag) which exists on RAM5 of a personal computer 1 is rewritten, when a user interrupt processing section program receives the interruption processing from an operator, and a printing data forwarding section program performs various processings with reference to it.
[0027] Next, said printing data forwarding section program is explained based on drawing 5 . An operator creates data to print using application, after starting a printing system (step S101) (step S102). In addition, explanation is omitted in order for there to be nothing relation with the essence of this invention about the printing data origination approach. If an operator does the depression of the printing demand carbon button with which the user command input device 7 of a personal computer 1 is equipped (step S103), a printer driver will start creation of the printing data corresponding to the laser beam printer 3 which performs printing based on the printing data from application (step S104). A printer driver's termination of creation of printing data transmits printing data to printer Supra which transmits data to a laser beam printer 3 (step S106). (step S105)
[0028] Printer Supra starts transmission for the printing data of 1 byte of head from the Centronics port 8 to a laser beam printer 3 among the received printing data using the protocol of Centronics (step S107). Printer Supra sets the send state FLG which exists on RAM5 as CONTINUE (step S108). It judges that all transmission of printing data was completed when there were no printing data which should investigate whether printer Supra has printing data which should still be transmitted (step S110), and should be transmitted, a send state FLG is set to WAIT here (step S123), and this processing is ended (step S124).
[0029] On the other hand, printer Supra investigates a send state FLG, when there are non-sent out data (step S111), and when a send state FLG is CONTINUE Continue return printing data transmission to the above-mentioned step S109, and when a send state FLG is not CONTINUE

It is recognized as printing stop instruction by the operator having been published, and a control channel initiation recognition signal is outputted from the Centronics port 8 to a laser beam printer 3 (step S112), and printing stop instruction is continuously outputted from the Centronics port 8 (step S113).

[0030] In addition, a control channel initiation recognition signal is 1 byte of signal, and the signal about a control-related logical channel will be transmitted until it transmits a control channel termination recognition signal after this. Moreover, the same value as 1 byte of this control channel initiation recognition signal shall not exist in printing data. When the same value as a control channel initiation recognition signal comes out by image data etc., a dummy bit is inserted in the creation time of printing data, and discernment processing of distinguishing from a control channel initiation recognition signal is performed.

[0031] Printer Supra investigates whether a send state FLG is DISCARD (step S114), when a send state FLG is DISCARD, it recognizes it as the printing termination order by the operator having been published, outputs a printing data RESET instruction from the Centronics port 8 to a laser beam printer 3 (step S120), and outputs a control channel termination recognition signal from the Centronics port 8 following it (step S121). Then, printer Supra cancels the printing data which are not sent [which is carrying out current maintenance] out (step S122), sets a send state FLG to WAIT (step S123), and ends this processing (step S124).

[0032] On the other hand, printer Supra stands by a new instruction of fixed time amount and an operator, when a send state FLG is not DISCARD (step S115). After fixed time amount, when a send state FLG is STOP, the answer of the (step S116 judges that there were not affirmation) and a user instruction input, and processes step S114 again. When a send state FLG is not STOP, the answer of the (step S116 investigates whether negative) and a send state FLG are CONTINUE(s) (step S117).

[0033] When a send state FLG is CONTINUE, printer Supra judges that there was a resumption instruction of printing from an operator, sends out the resumption instruction of printing to a laser beam printer 3 (step S118), sends out a control channel termination recognition signal continuously (step S119), and resumes return printing data forwarding processing to the above-mentioned step S109. When a send state FLG is not CONTINUE, it is recognized as the abnormalities in the status (operating state) having occurred, and shifts to the above-mentioned step S120.

[0034] Next, actuation of the interruption processing by the side of a personal computer 1 (host computer) is explained to a detail based on drawing 6 . It is inputted from the user command input device 7 (a keyboard or mouse), and the trigger of interruption from an operator is notified to the corresponding interrupt handler. In addition, the instruction about the gestalt of this operation which an operator can notify is three, printing interruption, resumption of printing, and a printing termination.

[0035] If the interrupt by the operator occurs with the user command input unit 7 (step S201), the interruption factor is acquired (step S202), and it stores on RAM5. subsequently, the case where a send state FLG is not WAIT with reference to the send state FLG on current RAM5 (step S203) — (— the answer of step S203 judged it as under printing data transmission (it contains also during interruption), and negative) and current printer Supra acquired at the above-mentioned step S202 — it interrupts and a factor is referred to.

[0036] When an interruption factor is printing interruption, the answer of the (step S204 sets affirmation) and a send state FLG as STOP (step S208), and ends this processing (step S219). When an interruption factor is resumption of printing, the answer of the (step S205 sets affirmation) and a send state FLG as CONTINUE (step S209), and ends this processing (step S214). When an interruption factor is a printing termination, the answer of the (step S206 sets affirmation) and a send state FLG as DISCARD (step S210), and ends this processing (step S219).

[0037] When a send state FLG is WAIT, it judges that the answer of the (step S203 has completed all printing data transmission by affirmation) and printer Supra, and the interrupt handler itself transmits control instruction to a laser beam printer 3. Then, a control channel initiation recognition signal is transmitted through the Centronics port 8 to a laser beam printer 3

(step S207), and the interruption factor acquired at the above-mentioned step S202 is referred to.

[0038] When an interruption factor is printing interruption, the answer of the (step S211 sends out printing stop instruction to affirmation) and a laser beam printer 3 (step S214), and performs step S218. When an interruption factor is resumption of printing, the answer of the (step S212 sends out the resumption instruction of printing to affirmation) and a laser beam printer 3 (step S215), and performs step S218. When an interruption factor is a printing termination, printing stop instruction is sent out to (step S213) and a laser beam printer 3 (step S216), a printing data RESET instruction is sent out continuously (step S217), and step S218 is performed. At step S218, a control channel termination recognition signal is sent out to a laser beam printer 3, and this processing is ended (step S219).

[0039] Next, actuation of the program of Maine by the side of a laser beam printer 3 (printer) is explained based on drawing 7 . In a laser beam printer 3 side, printing processings (printing control, rasterizing, paper transfer control, etc.) are performed by the program of Maine, and an interrupt handler performs data reception from a personal computer 1 through the Centronics port 13. It opts for the processing which a main program should perform with reference to the printing status fundamentally. Moreover, an interrupt handler notifies the instruction received from the personal computer 1 to a main program by updating the printing status.

[0040] If a power source is switched on (step S301), a laser beam printer 3 will start processing, will initialize the laser beam printer concerned itself (step S302), and will set the printing status on RAM11 as printing activation (step S303). Subsequently, it investigates whether the printing data which should be printed in the 2nd memory 20 (refer to drawing 4) which is a printing data storage field on RAM11 are stored (step S304). When there are no data which should be printed, step S304 is performed again.

[0041] When there are data which should be printed, the printing status on RAM11 investigates whether it is printing activation (step S305). When the printing status is printing activation, printing processing of a page in which a degree should be printed is performed (step S306). And when the delivery of the paper which the page concerned printed is completed normally, the printing data on the 2nd memory 20 on (step S307) and RAM11 which ended printing processing are deleted (step S308), and step S304 is performed again.

[0042] In the above-mentioned step S305, when the printing status is not printing activation, it investigates whether the printing status is printing reset (step S309). When the printing status is printing reset, all the data in the 2nd memory 20 which is a printing data storage field on RAM11 are canceled (step S310). And after initializing a laser beam printer 3 (step S311) and completing initialization, the printing status is set as activation (step S312), and step S304 is performed again.

[0043] In the above-mentioned step S309, when the printing status is not printing reset, the printing status investigates whether it is printing interruption (step S313). When the printing status is printing interruption, step S305 is performed that the following user command should be acquired. When the printing status is not printing interruption, it judges that the status is unusual, all the data in the 2nd memory 20 which is a printing data storage field on RAM11 are canceled, and a laser beam printer 3 is initialized (step S314). After initialization is completed, the printing status is set as activation (step S315), and step S304 is performed again.

[0044] Next, actuation of the interrupt handler of a laser beam printer 3 (printer) is explained based on drawing 8 . An interrupt handler is started at the time of completion of initialization of a laser beam printer 3 (step S401), and stands by interruption from a personal computer 1 (host computer) (step S402). Generating of interruption investigates whether nSTROB of the Centronics line 2 was turned off through the Centronics port 13 (step S403).

[0045] When not turned off, processing corresponding to each interruption is performed (step S405). When turned off, BUSY of the Centronics line 2 is set to HIGH through the Centronics port 13 (step S404), the further interruption from a personal computer 1 is refused, and data are incorporated from the DATA line of the Centronics line 2 through the Centronics port 13 (step S406). And the data concerned judge whether it is data of a control channel (step S407). In this case, it judges by whether it is data of the section when data were sandwiched by the control

channel initiation identifier and the termination identifier.
[0046] When the incorporated data are not data of a control channel, it is judged as the usual printing data and stores in the 2nd memory 20 on RAM11 (step S408). And it investigates whether there is any opening which can still store printing data in the 2nd memory 20 (step S409). When there is no opening in the 2nd memory 20, fixed time amount standby is carried out and step S409 is performed again. When an opening is in the 2nd memory 20, BUSY of the Centronics line 2 is set to LOW (step S410), and the purport in which interruption reception of the degree from a personal computer 1 is possible is notified to the computer 1 concerned. Then, nACK of the Centronics line 2 is transmitted through the Centronics port 13 (step S411), 1 byte of data reception completion is notified, and step S402 is performed again that the following data should be received.
[0047] On the other hand, when the incorporated data are data of a control channel, it is judged as the data of control instruction and stores in the 1st memory 19 (refer to drawing 4) on RAM11 (step S412). And it investigates whether there is any opening which can still store control instruction data in the 1st memory 19 (step S413). When there is no opening in the 1st memory 19, fixed time amount standby is carried out and step S413 is performed again. When an opening is in the 1st memory 19, BUSY of the Centronics line 2 is set to LOW (step S414), and the purport in which interruption reception of the degree from a personal computer 1 is possible is notified to the computer 1 concerned. Then, nACK of the Centronics line 2 is transmitted through the Centronics port 13, and 1 byte of data reception completion is notified (step S415).
[0048] It investigates whether the control instruction stored in the 1st memory 19 is printing stop instruction after advice of data reception completion (step S416). When control instruction is printing stop instruction, the printing status is set as printing interruption that it should notify to Maine (step S417), the printing stop instruction of the 1st memory 19 is cleared after setting-out termination (step S423), and step S402 is performed.
[0049] In the above-mentioned step S416, when the control instruction stored in the 1st memory 19 is not printing stop instruction, it investigates whether the control instruction stored in the 1st memory 19 is a printing RESET instruction (step S418). When control instruction is a printing RESET instruction, the printing status is set as Printing RESET that it should notify to Maine (step S419), the printing RESET instruction of the 1st memory 19 is cleared after setting-out termination (step S423), and step S402 is performed.
[0050] In the above-mentioned step S416, when the control instruction stored in the 1st memory 19 is not a printing RESET instruction, it investigates whether the control instruction stored in the 1st memory 19 is a resumption instruction of printing (step S420). When control instruction is a resumption instruction of printing, the printing status is set as resumption of printing that it should notify to Maine (step S421), the resumption instruction of printing of the 1st memory 19 is cleared after setting-out termination (step S423), and step S402 is performed.
[0051] In the above-mentioned step S416, when the control instruction stored in the 1st memory 19 is not a resumption instruction of printing, it is recognized as the abnormalities in the status having occurred, the printing status is set as Printing RESET (step S422), and step S402 is performed after setting-out termination.
[0052] As mentioned above, since the operator of a printing system can interrupt or stop printing processing of a laser beam printer 3 immediately when he directs interruption or a termination of printing to a laser beam printer 3 through the user command input unit 7 of a personal computer 1, while not performing useless printing and being able to cancel the futility of a form or a toner, according to the gestalt of the 1st operation, release of a laser beam printer 3 also becomes possible immediately. Moreover, a personal computer 1 and a laser beam printer 3 have the advantage that it is not necessary to add new hardware, by adopting the approach by the gestalt of the 1st operation. Moreover, it is possible to also realize port setting out of the hardware to be used in the conventional state.
[0053] (2) Replace the gestalt of operation of the gestalt 2nd of the 2nd operation with the approach of sending out control command in the gestalt of implementation of the above 1st using the data line of the Centronics line 2, and it notifies printing stop instruction, the resumption instruction of printing, and a printing termination order to a laser beam printer 3 using

the intact BIT number (5-7) of the control line of the Centronics line 2. Since it is the same as that of each bit control approach in nSTROB of the Centronics line 2 etc., the control approach of the control lines 5-BIT 7 is omitted for details.
[0054] Drawing 9 is drawing showing two examples of a definition of the control instruction of the control cutting tool of the Centronics control. Example 1 — a printing interruption instruction — in ON and the resumption instruction of printing, ON and a printing termination order set [BIT5] BIT7 to ON for BIT6. moreover — Example 2 — a printing interruption instruction -- ON and a printing termination order carry out [BIT /5 / instruction / OFF (when BIT5 is always turned off during interruption and it is turned on, unless a laser beam printer 3 has a printing termination order, it is recognized as interruption instruction discharge), and / of printing / resumption] BIT6 as ON in BIT5. In addition, a printing termination order also has the approach for which nINIT of a control line is substituted.
[0055] The signal of a pulse condition is sent out by setting the control signal sending-out approach of each instruction for a laser beam printer 3 to HIGH from a personal computer 1 to each bit (DEFAULT level OFF) in the gestalt of the 2nd operation, and carrying out after [OFF] fixed time amount. Since the detail of the system configuration concerning the gestalt of the 2nd operation, an internal-block configuration, and actuation is almost the same as the gestalt of implementation of the above 1st, only a difference is explained below.
[0056] With the gestalt of the 2nd operation, since there is no need of setting up a logical channel in order to use a control line, sending-out" becomes unnecessary about a control channel termination identifier to sending-out" and "laser beam printer to "laser beam printer of operation applied to steps S112, S119, and S122 of drawing 5 R> 5, and steps S207 and S218 of drawing 6 among the actuation in a personal computer 1 in a control channel initiation identifier.
[0057] Moreover, with the gestalt of the 2nd operation, in a laser beam printer 3 side, when it interrupts, the controller is monitoring the condition of the control lines 5-BIT 7 continuously and the condition of a signal line has change, it is made the trigger and an interrupt handler is operated.
[0058] Moreover, in order that control instruction may use another line physically [printing data] with the gestalt of the 2nd operation, From step S412 of drawing 8 to the step S415 is unnecessary among actuation of the interrupt handler of a laser beam printer 3. "It judges whether BIT 5-7 of a control line had change" before step S403, when a judgment result is yes, step S416 is performed, and when a judgment result is no, step S403 is performed.
[0059] As mentioned above, according to the gestalt of the 2nd operation, generate possibility that port setting out of the hardware used as compared with the gestalt of implementation of the above 1st must be changed, but Since the driver DLL which controls only BIT 5-7 of a control line is created independently and it can realize, modification to the data forwarding program using conventional Centronics As compared with the gestalt of implementation of the above 1st, it is few, and ends, and, thereby, the time amount which development takes can be shortened. Moreover, even when a laser beam printer 3 cannot receive printing data in the state of memory full, the interruption and the termination of printing processing in a laser beam printer 3 are possible.
[0060] (3) If the whole printing system configuration concerning the gestalt of gestalt point ** of the 3rd operation and the 3rd operation is explained based on drawing 12 , this printing system has composition equipped with the personal computer 21 as a host computer, and the laser beam printer 23 as a printer connected to this personal computer 21 through Centronics line 22a and control-line 22b.
[0061] Next, if the internal configuration of the personal computer 21 of the printing system concerning the gestalt of the 3rd operation is explained based on drawing 10 , the personal computer 21 has composition equipped with CPU24, RAM25, a hard disk 26, the user command input device 27, the Centronics port 28, control signal sending-out equipment 29, and Maine Bath 30.
[0062] If the configuration of each part of the above is explained in full detail, CPU24 will control each part of a personal computer based on a program. RAM25 is used as a work area. A hard disk 26 may store a program and a floppy disk, CDROM, etc. may be used for it instead of a hard

disk 26. The user command input unit 27 is for an operator to input various commands, and specifically consists of a mouse, a keyboard, etc. The Centronics port 28 outputs printing data etc. to a laser beam printer 23 through Centronics line 22a. Control signal sending-out equipment 29 outputs a control signal to a laser beam printer 23 through control-line 22b. Maine Bath 30 is a common signalling channel.

[0063] Moreover, if the internal configuration of the laser beam printer 23 of the printing system concerning the gestalt of the 3rd operation is explained based on drawing 11 , the laser beam printer 23 has composition equipped with CPU31, RAM32 and ROM33, the Centronics port 34, the paper transport device 35, imprint equipment 36, the electromagnetic wave signal receiving set 37, and Maine Bath 38.

[0064] If the configuration of each part of the above is explained in full detail, CPU31 will control each part of a laser beam printer based on a program. RAM32 is used as a work area. ROM33 may store a program and a floppy disk, CDROM, a hard disk, etc. may be used for it instead of ROM33. The Centronics port 34 incorporates printing data from Centronics line 22a. The paper transport device 35 controls conveyance of a print form by the interior of a laser beam printer. Imprint equipment 36 controls the device in which printing actuation is performed to a print form. The electromagnetic wave signal receiving set 37 receives an electromagnetic wave signal from control-line 22b. Maine Bath 38 is a common signalling channel.

[0065] In addition, especially with the gestalt of the 3rd operation, unless it refuses, CPU24 controls RAM25, a hard disk 26, the user command input unit 27, the Centronics port 28, and control signal sending-out equipment 29 by the personal computer 21 through Maine Bath 30, and CPU31 controls RAM32, ROM33, the Centronics port 34, the paper transport device 35, imprint equipment 36, and the electromagnetic wave signal receiving set 37 by the laser beam printer 23 through Maine Bath 38.

[0066] Actuation of the printing system concerning the gestalt of the 3rd operation is the same as that of the printing system concerning the gestalt of implementation of the above 2nd almost, and in order that only the sending-out approach of control instruction may carry out difference, only a difference is explained below.

[0067] In a personal computer 21 side, the class (printing stop instruction, the resumption instruction of printing, printing RESET instruction) of a send statement and the instruction concerned is sent out to control signal sending-out equipment 29 at the time of generating of a control instruction sending-out demand. The control signal sending-out equipment 29 which received the control instruction sending-out demand sends out the demanded control instruction. The three following approaches can be considered as the sending-out approach of control instruction.

[0068] (i) Three or more physical lines for signal transduction to a laser beam printer 23 and a personal computer 21 are at a certain time. In this case, it is the approach define each instruction and a physical line by the same definition approach as the definition approach of an instruction of having used BIT 5-7 of the control line of Example 1 of drawing 9 , and control signal sending-out equipment 29 sends out an instruction according to that definition.

[0069] (ii) Two or more physical lines for signal transduction to a laser beam printer 23 and a personal computer 21 are at a certain time. In this case, it is the approach define each instruction and a physical line by the same definition approach as the definition approach of an instruction of having used BIT 5-6 of the control line of Example 2 of drawing 9 , and control signal sending-out equipment 29 sends out an instruction according to that definition.

[0070] (iii) One or more lines by which the synchronizing signal for taking the synchronization at the time of the physical line for signal transduction performing 1 or more and signal transduction in a laser beam printer 23 and a personal computer 21 is flowing are at a certain time. Drawing 13 is the example of a definition of the signal at that time, and each instruction. In this case, control signal sending-out equipment 29 has always sent out the synchronizing signal.

[0071] In the laser beam printer 23 side, the electromagnetic wave signal receiving set 37 received the synchronizing signal sent out from the control signal sending-out equipment 29 of a personal computer 21, and has always taken control signal sending-out equipment 29 and a synchronization. And when the level of control signal line 22b has change, according to the

definition of drawing 13 , it analyzes whether it is which control instruction from the level change, and the analysis result is reflected in the printing status.
[0072] As mentioned above, since advice of control instruction can be performed even if it does not use the Centronics port, according to the gestalt of the 3rd operation, it has the advantage that there is no need of changing the driver which operates the port of Centronics. Moreover, even when a laser beam printer 23 cannot receive printing data in the state of memory full, interruption or a termination of printing processing of a laser beam printer 23 is possible.
[0073] (4) If the whole printing system configuration concerning the gestalt of gestalt point ** of the 4th operation and the 4th operation is explained based on drawing 16 , this printing system has composition equipped with the personal computer 41 as a host computer, and the laser beam printer 42 as a printer with which wireless is transmitted from this personal computer 41.
[0074] Next, if the internal configuration of the personal computer 41 of the printing system concerning the gestalt of the 4th operation is explained based on drawing 14 , the personal computer 41 has composition equipped with CPU43, RAM44, a hard disk 45, the user command input device 46, the Centronics port 47, the electromagnetic wave signal launcher 48, and Maine Bath 49.
[0075] If the configuration of each part of the above is explained in full detail, CPU43 will control each part of a personal computer based on a program. RAM44 is used as a work area. A hard disk 45 may store a program and a floppy disk, CDROM, etc. may be used for it instead of a hard disk 45. The user command input unit 46 is for an operator to input various commands, and specifically consists of a mouse, a keyboard, etc. The Centronics port 47 outputs printing data etc. The electromagnetic wave signal launcher 48 discharges an electromagnetic wave signal to a laser beam printer 42. Maine Bath 30 is a common signalling channel.
[0076] Moreover, if the internal configuration of the laser beam printer 42 of the printing system concerning the gestalt of the 4th operation is explained based on drawing 15 , the laser beam printer 42 has composition equipped with CPU50, RAM51 and ROM52, the Centronics port 53, the paper transport device 54, imprint equipment 55, the control signal receiving set 56, and Maine Bath 57.
[0077] If the configuration of each part of the above is explained in full detail, CPU50 will control each part of a laser beam printer based on a program. RAM51 is used as a work area. ROM52 may store a program and a floppy disk, CDROM, a hard disk, etc. may be used for it instead of ROM52. The Centronics port 53 incorporates printing data etc. The paper transport device 54 controls conveyance of a print form by the interior of a laser beam printer. Imprint equipment 55 controls the device in which printing actuation is performed to a print form. The control signal receiving set 56 receives a control signal. Maine Bath 57 is a common signalling channel.
[0078] In addition, especially with the gestalt of the 4th operation, unless it refuses, CPU43 controls RAM44, a hard disk 45, the user command input unit 46, the Centronics port 47, and the electromagnetic wave signal launcher 48 by the personal computer 41 through Maine Bath 49, and CPU50 controls RAM51, ROM52, the Centronics port 53, the paper transport device 54, imprint equipment 55, and the control signal receiving set 56 by the laser beam printer 42 through Maine Bath 57.
[0079] The detail of operation of the gestalt of the 4th operation is the same as the gestalt of implementation of the above 3rd almost, and only the sending-out approach of control instruction carries out difference. Although the approach of notifying to a laser beam printer from a personal computer using a physical line was taken with the gestalt of implementation of the above 3rd, the approach of notifying to a laser beam printer 42 from a personal computer 41 using an electromagnetic wave is taken with the gestalt of the 4th operation. Since the discharge approach of an electromagnetic wave and the reception approach of an electromagnetic wave are well-known techniques, explanation is omitted. In addition, the definition approach of a signal is the same as the approach shown in above-mentioned drawing 13 .
[0080] As mentioned above, according to the gestalt of the 4th operation, in addition to the effectiveness in the gestalt of implementation of the above 3rd, there is an advantage that constraint of the physical location relation between a laser beam printer 42 and a personal computer 41 can be made loose.

[0081] In addition, even if it applies this invention to the system which consists of two or more devices, it may be applied to the equipment which consists of one device. Moreover, it cannot be overemphasized that this invention can be applied also when attained by supplying a program to a system or equipment. In this case, that system or equipment becomes possible [enjoying the effectiveness of this invention] by reading the storage which stored the program expressed by the software for attaining this invention to this system or equipment.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the block diagram showing the internal configuration of the personal computer concerning the gestalt of operation of the 1st of this invention.
[Drawing 2] It is the block diagram showing the internal configuration of the laser beam printer concerning the gestalt of the 1st operation.
[Drawing 3] It is the explanatory view showing the whole printing system configuration concerning the gestalt of the 1st operation.
[Drawing 4] It is the explanatory view showing two logical channels concerning the gestalt of the 1st operation.
[Drawing 5] It is the flow chart which shows actuation of printer Supra of the personal computer concerning the gestalt of the 1st operation.
[Drawing 6] It is the flow chart which shows actuation of the interruption processing by the side of the personal computer concerning the gestalt of the 1st operation.
[Drawing 7] It is the flow chart which shows actuation of the program of Maine by the side of the laser beam printer concerning the gestalt of the 1st operation.
[Drawing 8] It is the flow chart which shows actuation of the interrupt handler of the laser beam printer concerning the gestalt of the 1st operation.
[Drawing 9] It is the explanatory view showing two examples of a definition of the control instruction of the control cutting tool of the Centronics line concerning the gestalt of operation of the 2nd of this invention.
[Drawing 10] It is the block diagram showing the internal configuration of the personal computer concerning the gestalt of operation of the 3rd of this invention.
[Drawing 11] It is the block diagram showing the internal configuration of the laser beam printer concerning the gestalt of the 3rd operation.
[Drawing 12] It is the explanatory view showing the whole printing system configuration concerning the gestalt of the 3rd operation.
[Drawing 13] It is the explanatory view showing the example of a definition of a signal and each instruction concerning the gestalt of the 3rd operation.
[Drawing 14] It is the block diagram showing the internal configuration of the personal computer concerning the gestalt of operation of the 4th of this invention.
[Drawing 15] It is the block diagram showing the internal configuration of the laser beam printer concerning the gestalt of the 4th operation.
[Drawing 16] It is the explanatory view showing the whole printing system configuration concerning the gestalt of the 4th operation.
[Description of Notations]
1 Personal Computer (Host Computer)
3, 23, 42 Laser beam printer (printer)
7, 27, 46 User command input unit (input means)
8 Centronics Port (Transmitting Means)
10, 31, 50 CPU (a distinction means, control means)
29 Control Signal Sending-Out Equipment (Transmitting Means)

48 Electromagnetic Wave Signal Launcher (Transmitting Means)

[Translation done.]

* NOTICES *

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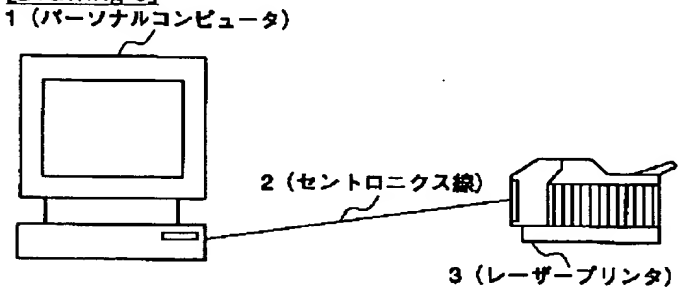
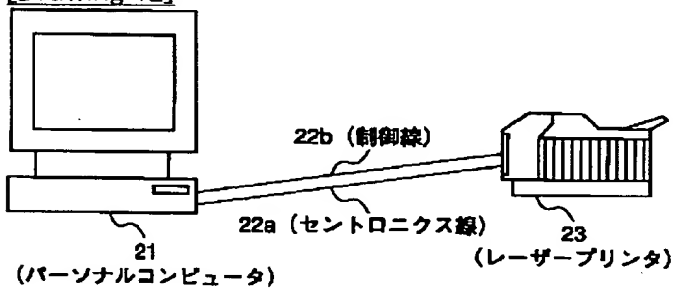
3.In the drawings, any words are not translated.

DRAWINGS

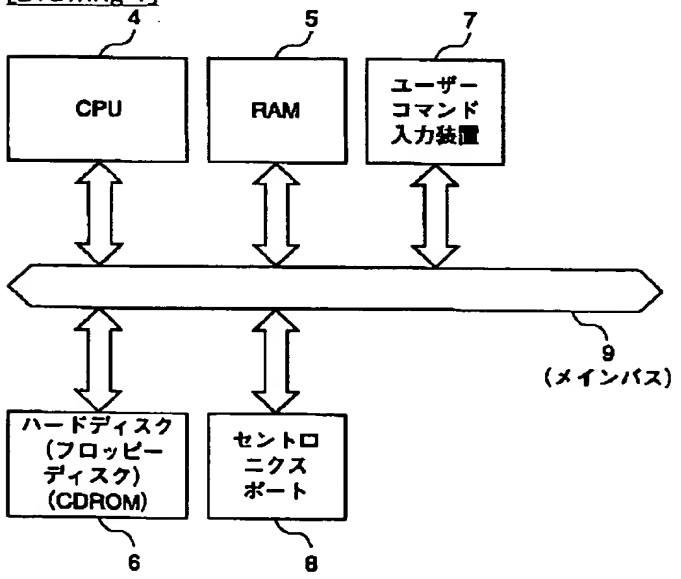
[Drawing 3]



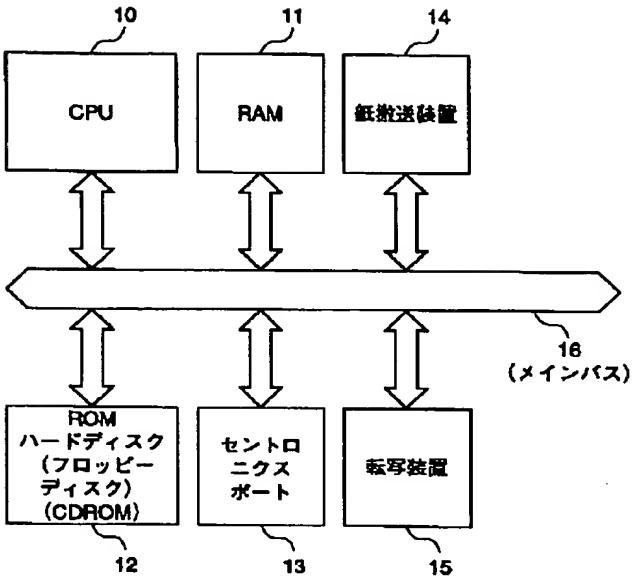
[Drawing 12]



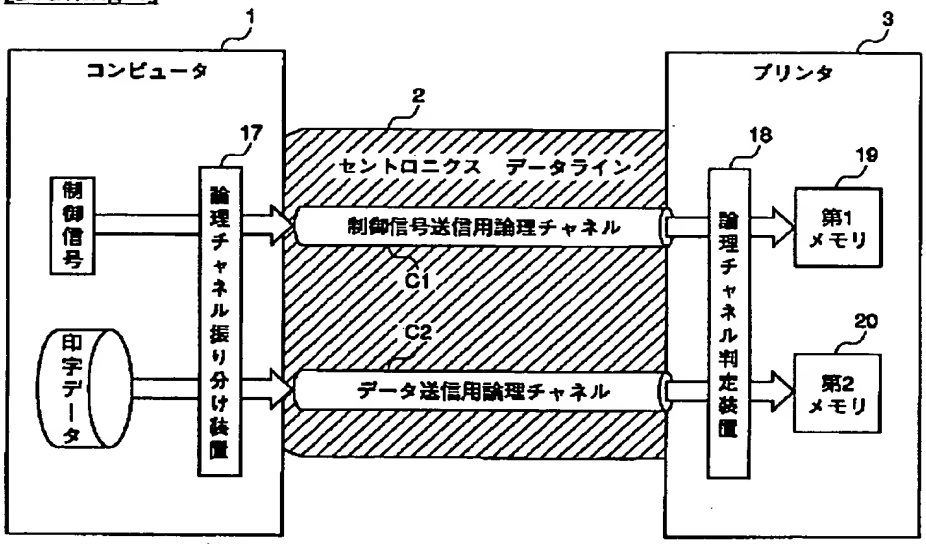
[Drawing 1]



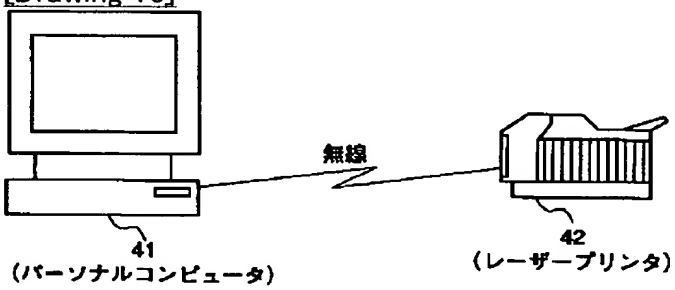
[Drawing 2]



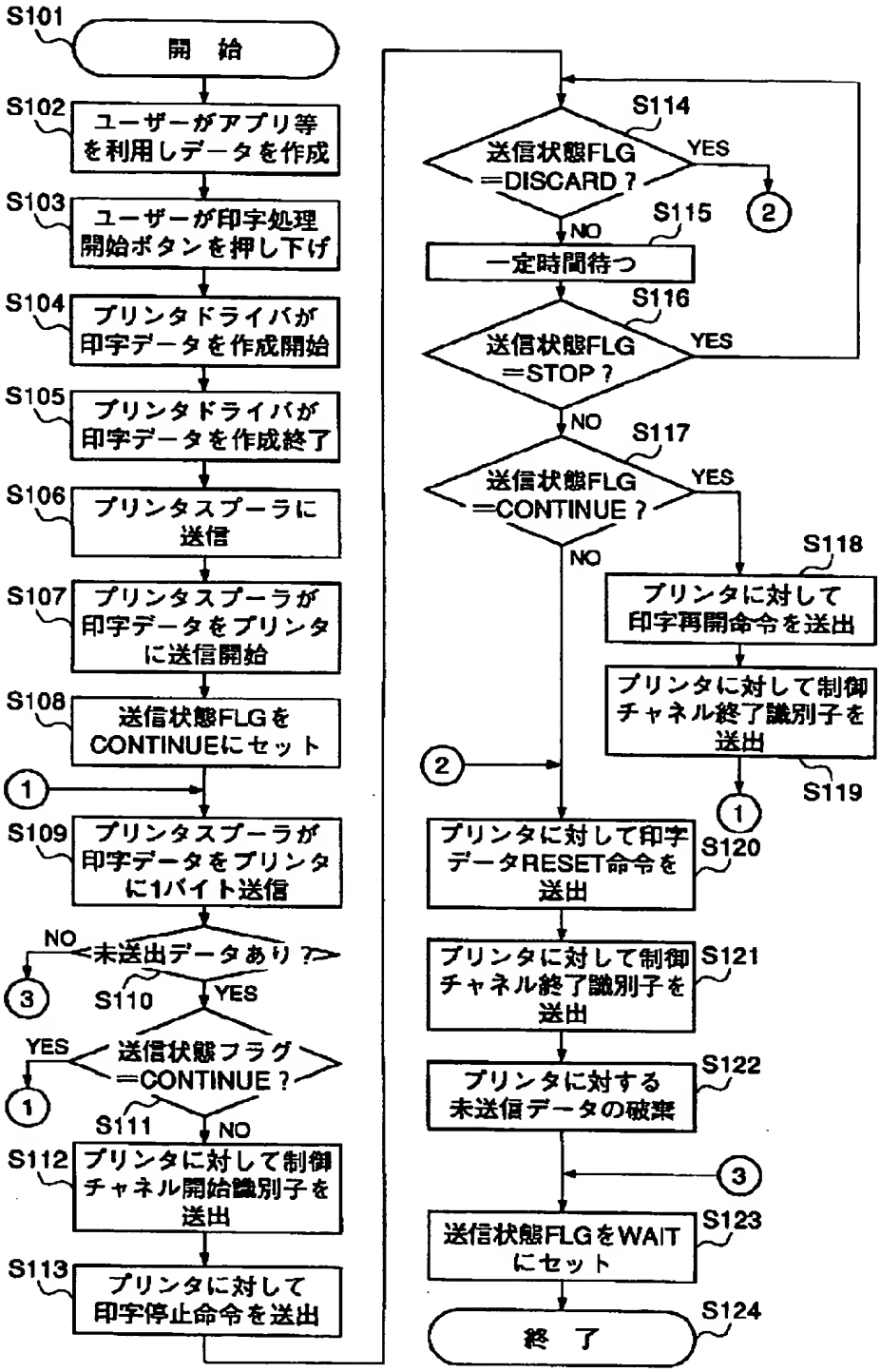
[Drawing 4]



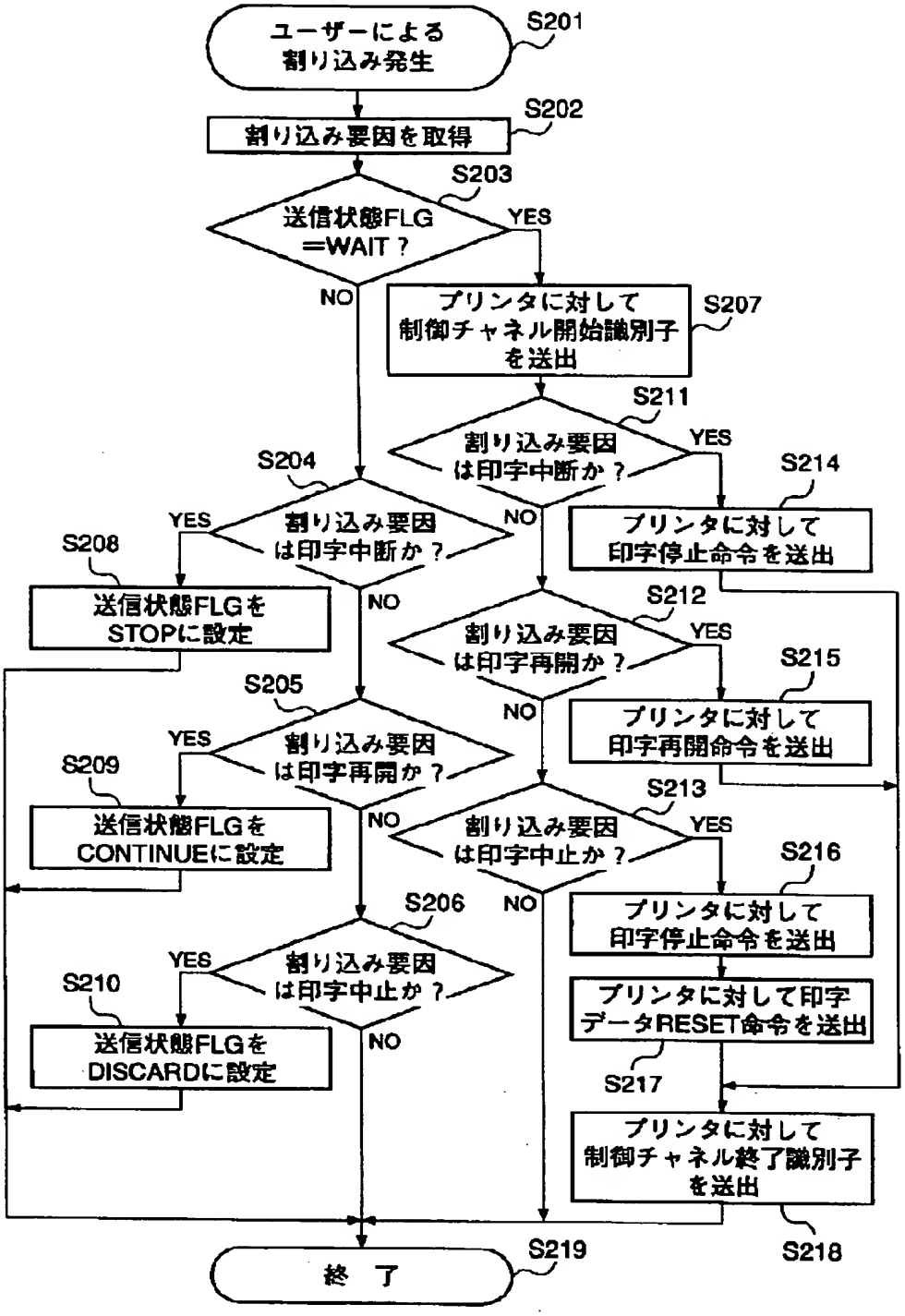
[Drawing 16]



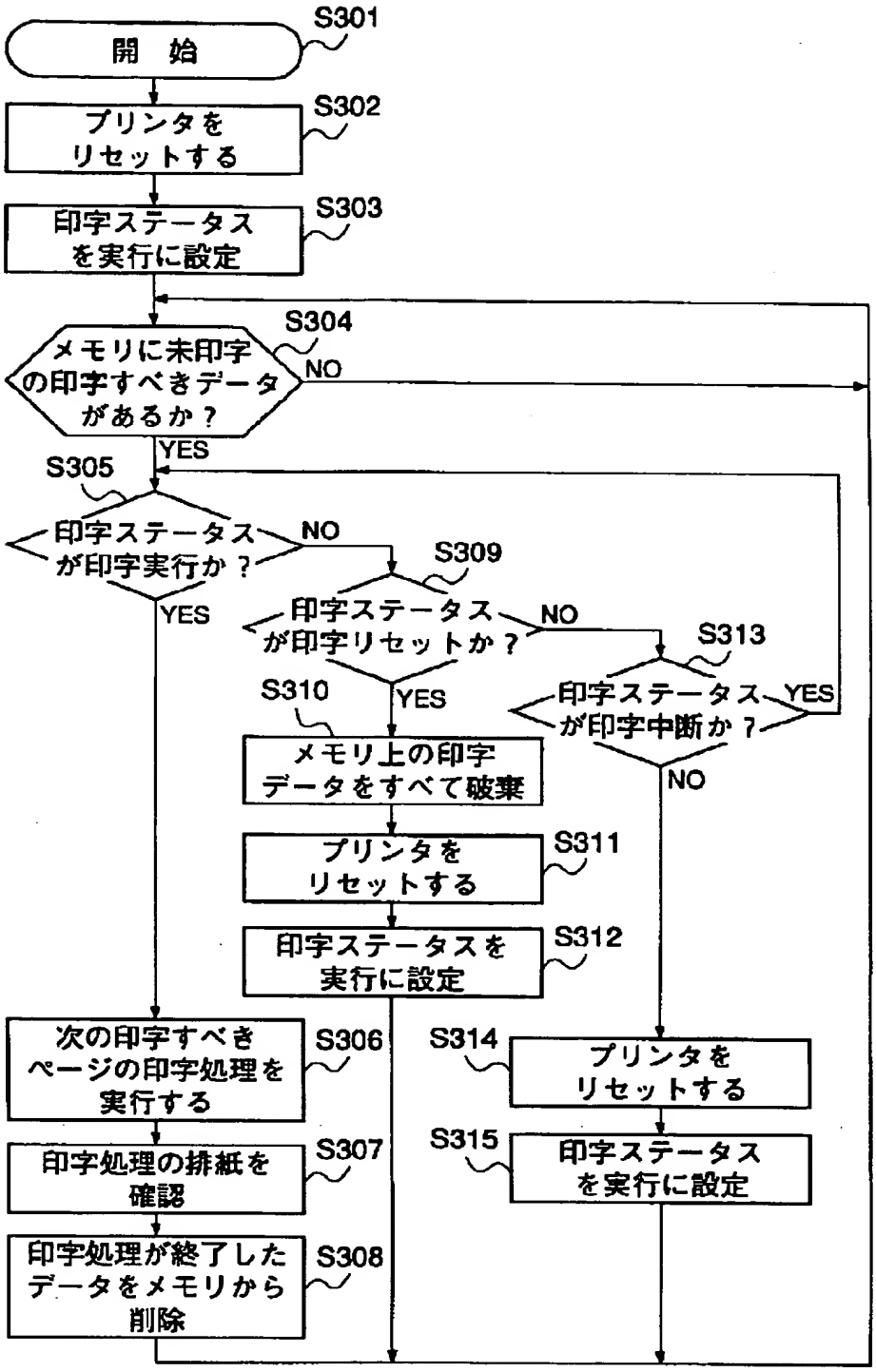
[Drawing 5]


S101
開 始
S102
ユーザーがアプリ等を利用しデータを作成
S103
ユーザーが印字処理開始ボタンを押し下げ
S104
プリンタドライバが印字データを作成開始
S105
プリンタドライバが印字データを作成終了
S106
プリンタスプーラに送信
S107
プリンタスプーラが印字データをプリンタに送信開始
S108
送信状態FLGをCONTINUEにセット
1
S109
プリンタスプーラが印字データをプリンタに1バイト送信
NO
未送出データあり？
3
S110
YES
YES
送信状態フラグ＝CONTINUE？
1
S111
NO
S112
プリンタに対して制御チャネル開始識別子を送出
S113
プリンタに対して印字停止命令を送出
S114
送信状態FLG＝DISCARD？
YES
2
NO
S115
一定時間待つ
S116
送信状態FLG＝STOP？
YES
NO
S117
送信状態FLG＝CONTINUE？
YES
NO
S118
プリンタに対して印字再開命令を送出
プリンタに対して制御チャネル終了識別子を送出
S119
1
2
プリンタに対して印字データRESET命令を送出
S120
プリンタに対して制御チャネル終了識別子を送出
S121
プリンタに対する未送信データの破棄
S122
3
送信状態FLGをWAITにセット
S123
終 了
S124

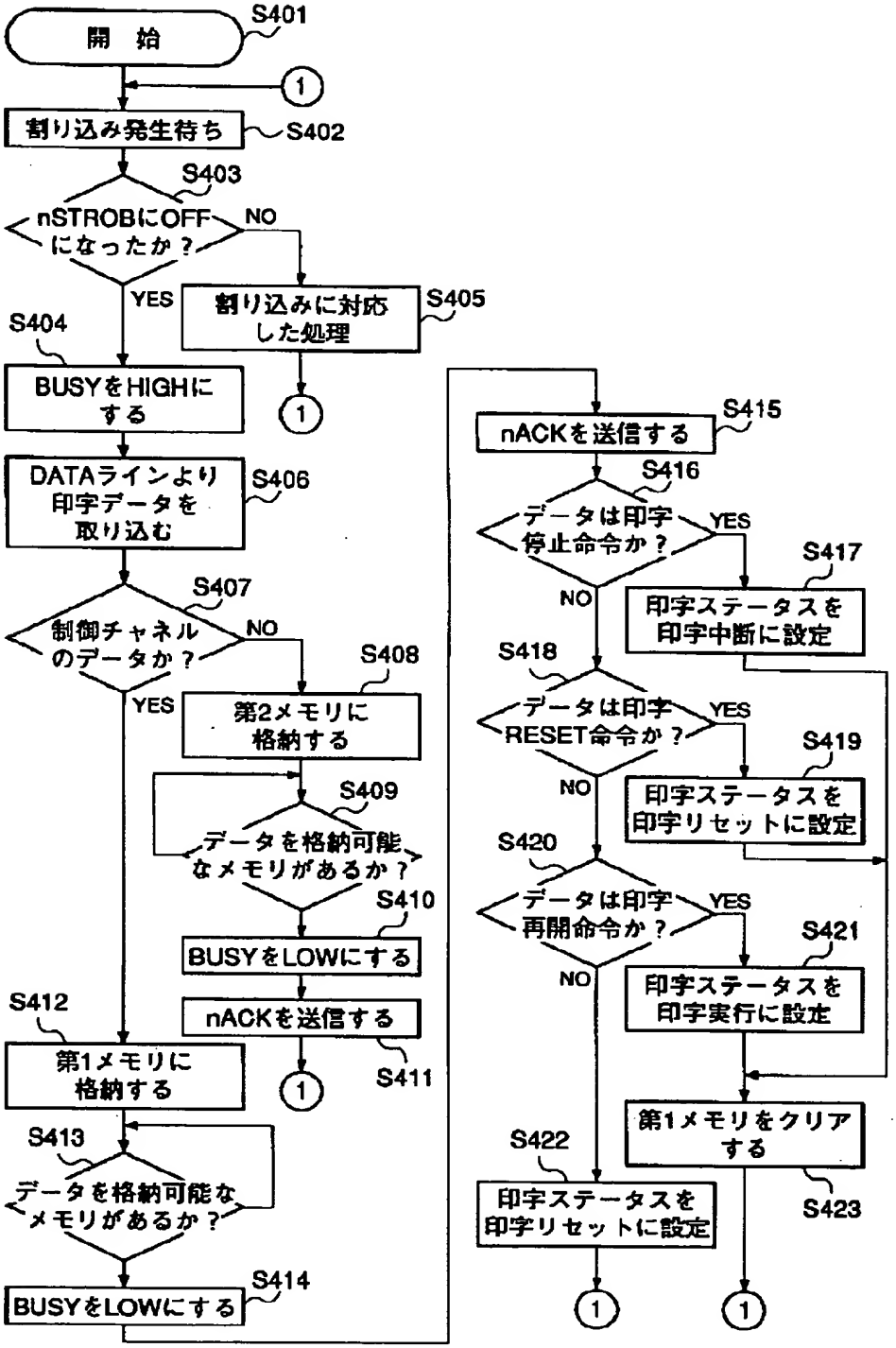
[Drawing 6]


ユーザーによる
割り込み発生
S201
割り込み要因を取得
S202
S203
送信状態FLG
=WAIT ?
YES
NO
プリンタに対して
制御チャネル開始識別子
を送出
S207
S211
割り込み要因
は印字中断か ?
YES
S214
プリンタに対して
印字停止命令を送出
S204
割り込み要因
は印字中断か ?
YES
NO
S208
送信状態FLGを
STOPに設定
S212
割り込み要因
は印字再開か ?
YES
S215
プリンタに対して
印字再開命令を送出
NO
S205
割り込み要因
は印字再開か ?
YES
S209
送信状態FLGを
CONTINUEに設定
NO
S213
割り込み要因
は印字中止か ?
YES
S216
プリンタに対して
印字停止命令を送出
NO
S206
割り込み要因
は印字中止か ?
YES
S210
送信状態FLGを
DISCARDに設定
NO
プリンタに対して印字
データRESET命令を送出
S217
プリンタに対して
制御チャネル終了識別子
を送出
S218
終 了
S219

[Drawing 7]


S301
開　始
S302
プリンタを
リセットする
S303
印字ステータス
を実行に設定
S304
メモリに未印字
の印字すべきデータ
があるか？
NO
YES
S305
印字ステータス
が印字実行か？
NO
YES
S309
印字ステータス
が印字リセットか？
NO
YES
S313
印字ステータス
が印字中断か？
YES
NO
S310
メモリ上の印字
データをすべて破棄
S311
プリンタを
リセットする
S312
印字ステータスを
実行に設定
S306
次の印字すべき
ページの印字処理を
実行する
S307
印字処理の排紙を
確認
S308
印字処理が終了した
データをメモリから
削除
S314
プリンタを
リセットする
S315
印字ステータス
を実行に設定

[Drawing 8]


開　始
S401
1
割り込み発生待ち
S402
S403
nSTROBにOFFになったか？
NO
YES
割り込みに対応した処理
S405
S404
BUSYをHIGHにする
1
DATAラインより印字データを取り込む
S406
S407
制御チャネルのデータか？
NO
YES
S408
第2メモリに格納する
S409
データを格納可能なメモリがあるか？
S410
BUSYをLOWにする
nACKを送信する
S411
S412
第1メモリに格納する
1
S413
データを格納可能なメモリがあるか？
S414
BUSYをLOWにする
nACKを送信する
S415
S416
データは印字停止命令か？
YES
NO
S417
印字ステータスを印字中断に設定
S418
データは印字RESET命令か？
YES
NO
S419
印字ステータスを印字リセットに設定
S420
データは印字再開命令か？
YES
NO
S421
印字ステータスを印字実行に設定
第1メモリをクリアする
S423
S422
印字ステータスを印字リセットに設定
1
1

[Drawing 9]

セントロニクス線　プリンターベンダーに開放されている
コントロールバイトの利用

例1

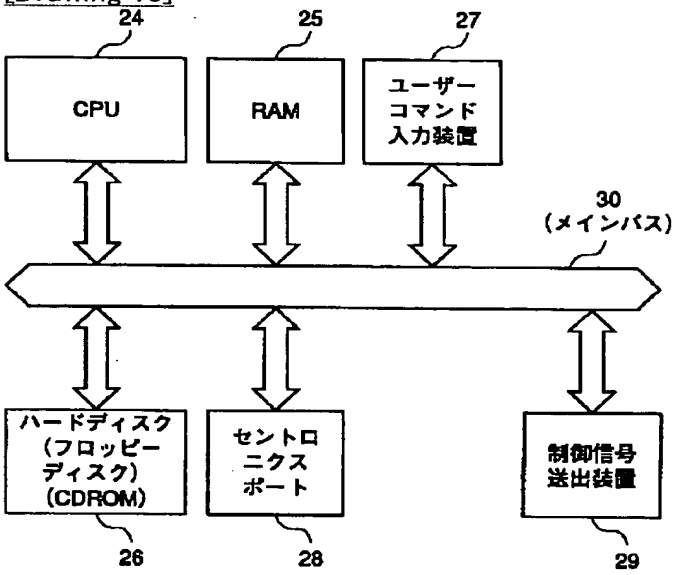
命令　BIT番号	5	6	7
印刷中断命令	ON	-	-
印刷再開命令	-	ON	-
印刷中止命令	-	-	ON

例2

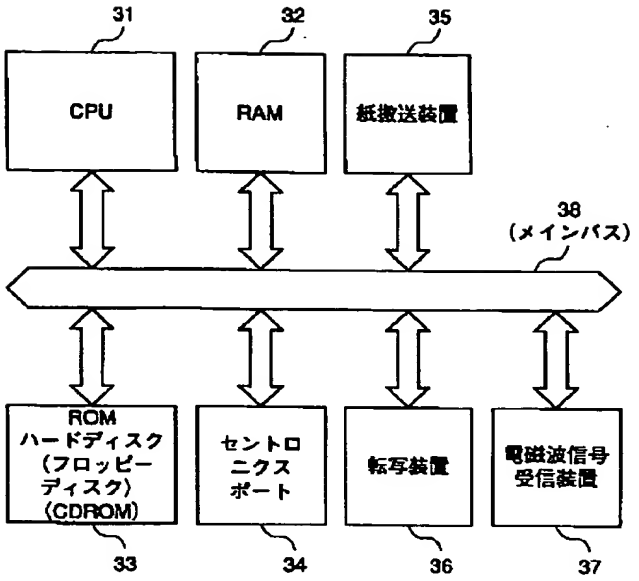
命令　BIT番号	5	6	7
印刷中断命令	OFF	-	-
印刷再開命令	ON	-	-
印刷中止命令	-	ON	-

(-.... DONT CARE)

[Drawing 10]



[Drawing 11]

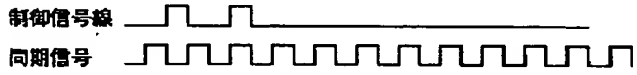


[Drawing 13]

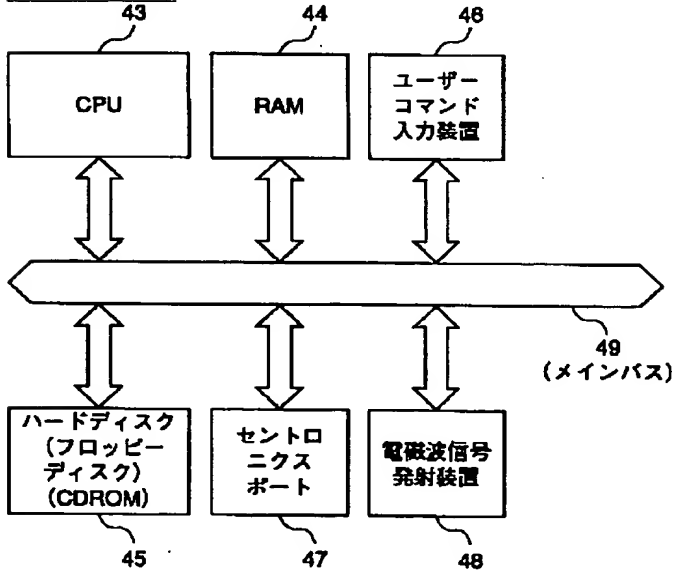
1 印字停止命令

2 印字再開命令

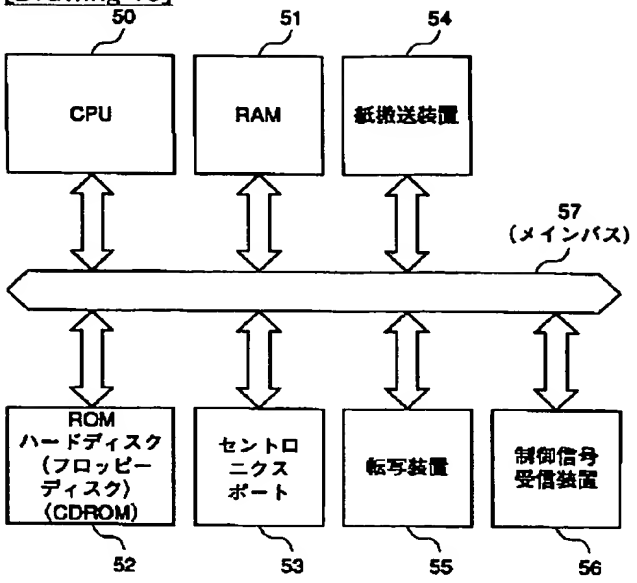
3 印字データRESET命令



[Drawing 14]



[Drawing 15]



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CORRECTION OR AMENDMENT

[Kind of official gazette] Printing of amendment by the convention of 2 of Article 17 of Patent Law
[Category partition] The 3rd partition of the 6th category
[Publication date] July 6, Heisei 13 (2001. 7.6)

[Publication No.] JP,9-114608,A
[Date of Publication] May 2, Heisei 9 (1997. 5.2)
[Annual volume number] Open patent official report 9-1147
[Application number] Japanese Patent Application No. 7-295948
[The 7th edition of International Patent Classification]

G06F 3/12

B41J 5/30
29/38

[FI]

G06F 3/12 A
C
B41J 5/30 Z
29/38 Z

[Procedure amendment]
[Filing Date] June 29, Heisei 12 (2000. 6.29)
[Procedure amendment 1]
[Document to be Amended] Description
[Item(s) to be Amended] Claim
[Method of Amendment] Modification
[Proposed Amendment]
[Claim(s)]
[Claim 1] In the printing system equipped with the host computer which has the function to transmit printing data, and the printer which has the function to print the printing data received from this host computer for every page,
The printing system characterized by providing the following. Said host computer is an input means for inputting the command which directs interruption of printing processing, a restart, or destruction of printing data to said printer. It is a distinction means by which provide a transmitting means to transmit immediately the command inputted through this input means to said printer, and said printer distinguishes the class of command received from said host computer. The control means cancel all the printing data that are not printed in the printer concerned when make the printing processing under interruption resume when printing processing of the following page interrupts and a receiving command is distinguished from a restart directive command and a receiving command is distinguished from a destruction directive

command, while making the printing processing of the applicable page under printing processing activation complete, when a receiving command is distinguished from an interruption directive command by this distinction means, and have to a new printing instruction

[Claim 2] It is the printing system characterized by transmitting said transmitting means in said printing system according to claim 1 using an electromagnetic wave.

[Claim 3] It is the printing system which sets to said printing system according to claim 1, and is characterized by transmitting said transmitting means through lines other than the line used for the usual printing data transfer between said host computers and said printers.

[Claim 4] It is the printing system which sets to said printing system according to claim 1, and is characterized by transmitting said transmitting means using the intact control cutting tool of the Centronics line who uses for the usual printing data transfer between said host computers and said printers.

[Claim 5] It is the printing system which sets to said printing system according to claim 1, and is characterized by for said transmitting means setting up a logical channel on the physical channel of the data byte of the Centronics line used for the usual printing data transfer between said host computers and said printers, and transmitting said command on said logical channel.

[Claim 6] Said printer is a printing system characterized by having the function which can receive said command from said host computer even when printing data storage is in a full condition in said printing system according to claim 1.

[Claim 7] In the printing control approach of a printer of having the function to print the printing data received from the host computer which has the function to transmit printing data for every page,

The printing control approach characterized by providing the following. The stroke which inputs the command which directs interruption of printing processing, a restart, or destruction of printing data from said host computer to said printer The stroke which transmits the inputted command to said printer immediately The stroke from which said printer distinguishes the class of command received from said host computer The stroke which interrupts printing processing of the following page while making printing processing of the applicable page under printing processing activation complete, when a receiving command is distinguished from an interruption directive command, the stroke which make the printing processing under interruption resume when a receiving command is distinguished from a restart directive command, and the stroke cancel all the printing data that are not printed in said printer when a receiving command is distinguished from a destruction directive command

[Claim 8] It is the printing control approach characterized by the stroke immediately transmitted to said printer performing said inputted command in said printing control approach according to claim 7 using an electromagnetic wave.

[Claim 9] The stroke which transmits said inputted command to said printer immediately in said printing control approach according to claim 7 is the printing control approach characterized by carrying out through lines other than the line which uses for the usual printing data transfer between said host computers and said printers.

[Claim 10] The stroke which transmits said inputted command to said printer immediately in said printing control approach according to claim 7 is the printing control approach characterized by carrying out using the intact control cutting tool of the Centronics line who uses for the usual printing data transfer between said host computers and said printers.

[Claim 11] The stroke which transmits said inputted command to said printer immediately in said printing control approach according to claim 7 is the printing control approach characterized by transmitting said command on the logical channel set up on the physical channel of the data byte of the Centronics line which uses for the usual printing data transfer between said host computers and said printers.

[Claim 12] The printing control approach characterized by having the stroke which can receive said command from said host computer in said printing control approach according to claim 7 even when the printing data storage of said printer is in a full condition.

[Claim 13] It is the airline printer which has the function to print the printing data received from the host computer which has the function to transmit printing data for every page.

A receiving means to receive a command from said host computer,
A distinction means to distinguish the class of command received from said host computer,
The airline printer carried out [having the control means which cancels the printing data which are not printed in an airline printer when the printing processing under interruption / when a command is distinguished from an interruption directive command, interrupt printing processing of printing data, and / when a command is distinguished from a restart directive command is made to resume and a command is distinguished from a destruction directive command, and] as the description.
[Claim 14] Said receiving means is an airline printer according to claim 13 characterized by receiving a command using an electromagnetic wave.
[Claim 15] Said receiving means is an airline printer according to claim 13 characterized by receiving a command through lines other than the line used for the usual printing data transfer between said host computers and said airline printers.
[Claim 16] Said receiving means is an airline printer according to claim 13 characterized by receiving a command using the intact control cutting tool of the Centronics line who uses for the usual printing data transfer between said host computers and said airline printers.
[Claim 17] Said receiving means is an airline printer according to claim 13 characterized by receiving a command on the logical channel set up on the physical channel of the data byte of the Centronics line used for the usual printing data transfer between said host computers and said airline printers.
[Claim 18] Said receiving means is an airline printer according to claim 13 characterized by reception of a command being possible from said host computer even when the printing data storage of said airline printer is in a full condition.
[Procedure amendment 2]
[Document to be Amended] Description
[Item(s) to be Amended] 0016
[Method of Amendment] Modification
[Proposed Amendment]
[0016] In order to attain the above-mentioned object, invention of claim 12 is characterized by having the stroke which can receive said command from said host computer in said printing control approach according to claim 7, even when the printing data storage of said printer is in a full condition. In order to attain the above-mentioned object, invention of claim 13 A receiving means to be the airline printer which has the function to print the printing data received from the host computer which has the function to transmit printing data for every page, and to receive a command from said host computer, A distinction means to distinguish the class of command received from said host computer, When a command is distinguished from an interruption directive command, printing processing of printing data is interrupted. When the printing processing under interruption when a command is distinguished from a restart directive command is made to resume and a command is distinguished from a destruction directive command, it is characterized by having the control means which cancels the printing data which are not printed in an airline printer. In order to attain the above-mentioned object, invention of claim 14 is characterized by said receiving means receiving a command using an electromagnetic wave. In order to attain the above-mentioned object, invention of claim 15 is characterized by said receiving means receiving a command through lines other than the line used for the usual printing data transfer between said host computers and said airline printers. In order to attain the above-mentioned object, invention of claim 16 is characterized by said receiving means receiving a command using the intact control cutting tool of the Centronics line who uses for the usual printing data transfer between said host computers and said airline printers. In order to attain the above-mentioned object, invention of claim 17 is characterized by said receiving means receiving a command on the logical channel set up on the physical channel of the data byte of the Centronics line used for the usual printing data transfer between said host computers and said airline printers. In order to attain the above-mentioned object, invention of claim 18 is characterized by reception of said host computer to a command being possible for said receiving means, even when the printing data storage of said airline printer is in a full

condition.
[Procedure amendment 3]
[Document to be Amended] Description
[Item(s) to be Amended] 0093
[Method of Amendment] Modification
[Proposed Amendment]
[0093] According to invention of claim 12, when the printing data storage of a printer is in a full condition in the printing control approach according to claim 7, or when [since it has the stroke which can receive a command from a host computer, while doing so the same effectiveness as invention of claim 7] a printer cannot receive printing data from a host computer, interruption of printing processing of a printer is attained. It is not necessary to perform useless printing and, according to invention of claim 13, the futility of a form or a toner can be canceled. Moreover, while release of the airline printer to a host computer also becomes possible immediately, a host computer and an airline printer have the advantage that it is not necessary to add new hardware. According to invention of claim 14, there is an advantage that constraint of the physical location relation between an airline printer and a host computer becomes loose. According to invention of claim 15, it becomes possible from a host computer to transmit the command to an airline printer immediately further. According to invention of claim 16, modification to the data forwarding program using Centronics becomes possible [shortening the time amount which there is and ends and development takes]. [comparatively little] According to invention of claim 17, even if it does not use the port of Centronics, a command can be transmitted, and it becomes unnecessary that this changes the hardware which operates the port of Centronics. According to invention of claim 18, even when an airline printer cannot receive printing data from a host computer, interruption of printing processing of an airline printer is attained.

[Translation done.]

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(43)公開日　平成９年(1997)５月２日

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						Ｃ
Ｂ４１Ｊ	5/30			Ｂ４１Ｊ	5/30	Ｚ
	29/38				29/38	Ｚ

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(72)発明者　磯田　隆司
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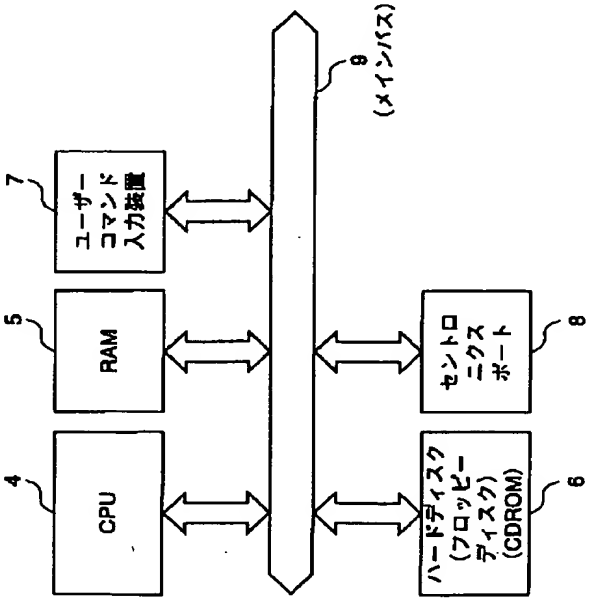
(74)代理人　弁理士　渡部　敏彦

(54)【発明の名称】　印刷システム及び印刷制御方法

(57)【要約】

【課題】　操作者が印字の中断または中止を指示した際に即時に印字処理を中断または中止することにより、無駄な印字を無くし用紙やトナーの無駄を解消すること等を可能とした印刷システム及び印刷制御方法を提供する。

【解決手段】　パーソナルコンピュータ１は、レーザープリンタ３に印字処理の中断／再開／印字データの破棄を指示するコマンドを入力するユーザーコマンド入力装置７と、入力コマンドを即時に印字装置へ送信するセントロニクスポート８とを備え、レーザープリンタ３は、受信コマンドが中断コマンドの場合に印字処理実行中の該当頁の印字処理を完了させると共に次頁の印字処理を中断させ，再開コマンドの場合に中断中の印字処理を再開させ，破棄コマンドの場合に当該印字装置内の未印字の全印字データを破棄するＣＰＵ１０とを備える。



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【特許請求の範囲】

【請求項１】　印字データを送信する機能を有するホストコンピュータと、該ホストコンピュータから受信した印字データを１頁毎に印字する機能を有する印字装置とを備えた印刷システムにおいて、

前記ホストコンピュータは、前記印字装置に対して印字処理の中断あるいは再開あるいは印字データの破棄を指示するコマンドを入力するための入力手段と、該入力手段を介して入力されたコマンドを前記印字装置へ即時に送信する送信手段とを具備し、前記印字装置は、前記ホストコンピュータから受信したコマンドの種類を判別する判別手段と、該判別手段により受信コマンドが中断指示コマンドと判別された場合に印字処理実行中の該当頁の印字処理を完了させると共に次頁の印字処理を中断させ，受信コマンドが再開指示コマンドと判別された場合に中断中の印字処理を再開させ，受信コマンドが破棄指示コマンドと判別された場合に当該印字装置内の未印字の全印字データを破棄し、新規の印字命令に備える制御手段とを具備することを特徴とする印刷システム。

【請求項２】　前記請求項１記載の印刷システムにおいて、前記送信手段は、電磁波を使用して送信することを特徴とする印刷システム。

【請求項３】　前記請求項１記載の印刷システムにおいて、前記送信手段は、前記ホストコンピュータと前記印字装置との間における通常の印字データの転送に用いるライン以外のラインを介して送信することを特徴とする印刷システム。

【請求項４】　前記請求項１記載の印刷システムにおいて、前記送信手段は、前記ホストコンピュータと前記印字装置との間における通常の印字データの転送に用いるセントロニクスラインの未使用のコントロールバイトを使用して送信することを特徴とする印刷システム。

【請求項５】　前記請求項１記載の印刷システムにおいて、前記送信手段は、前記ホストコンピュータと前記印字装置との間における通常の印字データの転送に用いるセントロニクスラインのデータバイトの物理チャネル上に論理チャネルを設定し、前記論理チャネル上で前記コマンドの送信を行うことを特徴とする印刷システム。

【請求項６】　前記請求項１記載の印刷システムにおいて、前記印字装置は、印字データ記憶装置がフル状態の場合でも前記ホストコンピュータから前記コマンドの受信が可能な機能を有することを特徴とする印刷システム。

【請求項７】　印字データを送信する機能を有するホストコンピュータから受信した印字データを１頁毎に印字する機能を有する印字装置の印刷制御方法において、

前記ホストコンピュータから前記印字装置に対して印字処理の中断あるいは再開あるいは印字データの破棄を指示するコマンドを入力する行程と、入力されたコマンドを前記印字装置へ即時に送信する行程と、前記印字装置

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が前記ホストコンピュータから受信したコマンドの種類を判別する行程と、受信コマンドが中断指示コマンドと判別された場合に印字処理実行中の該当頁の印字処理を完了させると共に次頁の印字処理を中断させる行程と、受信コマンドが再開指示コマンドと判別された場合に中断中の印字処理を再開させる行程と、受信コマンドが破棄指示コマンドと判別された場合に前記印字装置内の未印字の全印字データを破棄する行程とを有することを特徴とする印刷制御方法。

【請求項８】　前記請求項７記載の印刷制御方法において、前記入力されたコマンドを前記印字装置へ即時に送信する行程は、電磁波を使用して行うことを特徴とする印刷制御方法。

【請求項９】　前記請求項７記載の印刷制御方法において、前記入力されたコマンドを前記印字装置へ即時に送信する行程は、前記ホストコンピュータと前記印字装置との間における通常の印字データの転送に用いるライン以外のラインを介して行うことを特徴とする印刷制御方法。

【請求項１０】　前記請求項７記載の印刷制御方法において、前記入力されたコマンドを前記印字装置へ即時に送信する行程は、前記ホストコンピュータと前記印字装置との間における通常の印字データの転送に用いるセントロニクスラインの未使用のコントロールバイトを使用して行うことを特徴とする印刷制御方法。

【請求項１１】　前記請求項７記載の印刷制御方法において、前記入力されたコマンドを前記印字装置へ即時に送信する行程は、前記ホストコンピュータと前記印字装置との間における通常の印字データの転送に用いるセントロニクスラインのデータバイトの物理チャネル上に設定された論理チャネル上で前記コマンドの送信を行うことを特徴とする印刷制御方法。

【請求項１２】　前記請求項７記載の印刷制御方法において、前記印字装置の印字データ記憶装置がフル状態の場合でも前記ホストコンピュータから前記コマンドの受信が可能な行程を有することを特徴とする印刷制御方法。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、印刷システム及び印刷制御方法に係り、特に、無駄な印字を無くすことにより用紙やトナーの無駄を解消する場合などに好適な印刷システム及び印刷制御方法に関する。

【０００２】

【従来の技術】従来、印字データを印字装置へ送信可能なホストコンピュータと、当該ホストコンピュータから受信した印字データを１頁毎に印字して出力する印字装置とを備えた印刷システムが有る。この種の印刷システムにおいては、操作者がホストコンピュータのキーボード等から印字中断指示を入力すると、印字中断指示後は

ホストコンピュータからは印字データが印字装置へ送出されることはないが、印字中断指示前に印字装置がホストコンピュータから既に受信してしまっている印字データは、印字装置から印字出力されるようになっていた。

【０００３】

【発明が解決しようとする課題】しかしながら、従来の印刷システムにおいては、上述したように操作者がホストコンピュータから印字中断指示を行った場合、印字中断指示前に印字装置がホストコンピュータから既に受信済みの印字データは印字出力されるという問題があった。換言すれば、従来の印刷システムは、操作者が印字の中断または中止の指示をホストコンピュータへ入力した際に、ホストコンピュータから操作者の指示を即時に印字装置へ伝達すると共に、印字装置は印字中断または印字中止の指示を受信すると、即時に紙詰まりが発生しないような処理を施して印字処理を中断または中止するような機能は備えていなかった。従って、従来の印刷システムでは、無駄な印字が行われ、その結果、用紙やトナーの無駄が発生するという不具合があった。

【０００４】本発明は、上述した点に鑑みなされたものであり、操作者が印字の中断または中止を指示した際に即時に印字処理を中断または中止することにより、無駄な印字を無くし用紙やトナーの無駄を解消すること等を可能とした印刷システム及び印刷制御方法を提供することを目的とする。

【０００５】

【課題を解決するための手段】上記目的を達成するため、請求項１の発明は、印字データを送信する機能を有するホストコンピュータと、該ホストコンピュータから受信した印字データを１頁毎に印字する機能を有する印字装置とを備えた印刷システムにおいて、前記ホストコンピュータは、前記印字装置に対して印字処理の中断あるいは再開あるいは印字データの破棄を指示するコマンドを入力するための入力手段と、該入力手段を介して入力されたコマンドを前記印字装置へ即時に送信する送信手段とを具備し、前記印字装置は、前記ホストコンピュータから受信したコマンドの種類を判別する判別手段と、該判別手段により受信コマンドが中断指示コマンドと判別された場合に印字処理実行中の該当頁の印字処理を完了させると共に次頁の印字処理を中断させ，受信コマンドが再開指示コマンドと判別された場合に中断中の印字処理を再開させ，受信コマンドが破棄指示コマンドと判別された場合に当該印字装置内の未印字の全印字データを破棄し、新規の印字命令に備える制御手段とを具備することを特徴とする。

【０００６】上記目的を達成するため、請求項２の発明は、前記請求項１記載の印刷システムにおいて、前記送信手段は、電磁波を使用して送信することを特徴とする。

【０００７】上記目的を達成するため、請求項３の発明

は、前記請求項１記載の印刷システムにおいて、前記送信手段は、前記ホストコンピュータと前記印字装置との間における通常の印字データの転送に用いるライン以外のラインを介して送信することを特徴とする。

【０００８】上記目的を達成するため、請求項４の発明は、前記請求項１記載の印刷システムにおいて、前記送信手段は、前記ホストコンピュータと前記印字装置との間における通常の印字データの転送に用いるセントロニクスラインの未使用のコントロールバイトを使用して送信することを特徴とする。

【０００９】上記目的を達成するため、請求項５の発明は、前記請求項１記載の印刷システムにおいて、前記送信手段は、前記ホストコンピュータと前記印字装置との間における通常の印字データの転送に用いるセントロニクスラインのデータバイトの物理チャネル上に論理チャネルを設定し、前記論理チャネル上で前記コマンドの送信を行うことを特徴とする。

【００１０】上記目的を達成するため、請求項６の発明は、前記請求項１記載の印刷システムにおいて、前記印字装置は、印字データ記憶装置がフル状態の場合でも前記ホストコンピュータから前記コマンドの受信が可能な機能を有することを特徴とする。

【００１１】上記目的を達成するため、請求項７の発明は、印字データを送信する機能を有するホストコンピュータから受信した印字データを１頁毎に印字する機能を有する印字装置の印刷制御方法において、前記ホストコンピュータから前記印字装置に対して印字処理の中断あるいは再開あるいは印字データの破棄を指示するコマンドを入力する行程と、入力されたコマンドを前記印字装置へ即時に送信する行程と、前記印字装置が前記ホストコンピュータから受信したコマンドの種類を判別する行程と、受信コマンドが中断指示コマンドと判別された場合に印字処理実行中の該当頁の印字処理を完了させると共に次頁の印字処理を中断させる行程と、受信コマンドが再開指示コマンドと判別された場合に中断中の印字処理を再開させる行程と、受信コマンドが破棄指示コマンドと判別された場合に前記印字装置内の未印字の全印字データを破棄する行程とを有することを特徴とする。

【００１２】上記目的を達成するため、請求項８の発明は、前記請求項７記載の印刷制御方法において、前記入力されたコマンドを前記印字装置へ即時に送信する行程は、電磁波を使用して行うことを特徴とする。

【００１３】上記目的を達成するため、請求項９の発明は、前記請求項７記載の印刷制御方法において、前記入力されたコマンドを前記印字装置へ即時に送信する行程は、前記ホストコンピュータと前記印字装置との間における通常の印字データの転送に用いるライン以外のラインを介して行うことを特徴とする。

【００１４】上記目的を達成するため、請求項１０の発明は、前記請求項７記載の印刷制御方法において、前記

入力されたコマンドを前記印字装置へ即時に送信する行程は、前記ホストコンピュータと前記印字装置との間における通常の印字データの転送に用いるセントロニクスラインの未使用のコントロールバイトを使用して行うことを特徴とする。

【００１５】上記目的を達成するため、請求項１１の発明は、前記請求項７記載の印刷制御方法において、前記入力されたコマンドを前記印字装置へ即時に送信する行程は、前記ホストコンピュータと前記印字装置との間における通常の印字データの転送に用いるセントロニクスラインのデータバイトの物理チャネル上に設定された論理チャネル上で前記コマンドの送信を行うことを特徴とする。

【００１６】上記目的を達成するため、請求項１２の発明は、前記請求項７記載の印刷制御方法において、前記印字装置の印字データ記憶装置がフル状態の場合でも前記ホストコンピュータから前記コマンドの受信が可能な行程を有することを特徴とする。

【００１７】

【発明の実施の形態】以下、本発明の実施の形態を図面を参照して説明する。

【００１８】（１）第１の実施の形態

先ず、第１の実施の形態に係る印刷システムの全体構成を図３に基づき説明すると、本印刷システムは、ホストコンピュータとしてのパーソナルコンピュータ１と、該パーソナルコンピュータ１にセントロニクス線２（プリンタ用２４ビット並列インタフェース対応の接続線）を介して接続された印字装置としてのレーザープリンタ３とを備える構成となっている。

【００１９】尚、第１実施の形態及び後述する第２乃至第４の実施の形態では印字装置としてレーザプリンタを例に上げているが、印字装置としてはノンインパクト式（電子写真式、熱転写式、感熱式、インクジェット式、静電式、放電破壊式）あるいはインパクト式（ドット・インパクト式）の内の任意の方式による印字装置を用いることが可能である。

【００２０】次に、第１の実施の形態に係る印刷システムのパーソナルコンピュータ１の内部構成を図１に基づき説明すると、パーソナルコンピュータ１は、ＣＰＵ（中央処理装置）４と、ＲＡＭ（随時書き込み読み出しメモリ）５と、ハードディスク６と、ユーザーコマンド入力装置７と、セントロニクスポート８と、メインバス９とを備える構成となっている。

【００２１】上記各部の構成を詳述すると、ＣＰＵ４は、プログラムに基づきパーソナルコンピュータ各部を制御する。ＲＡＭ５は、ワークエリアとして使用される。ハードディスク６は、プログラムを格納するものであり、ハードディスク６の代わりにフロッピーディスク，ＣＤＲＯＭ（Compact Disc ROM），ＭＯ等を使用してもよい。ユーザーコマンド入力装置７は、操作者が印字要求命令・印字停止命令・印字中止命令・印字再開命令等のコマンドを入力するためのものであり、具体的にはマウスやキーボード等から構成される。セントロニクスポート８は、セントロニクス線２を介してレーザープリンタ３へ印字データ・各種命令・制御チャネル開始識別信号・制御チャネル終了識別信号等を出力する。メインバス９は、共通信号路である。

【００２２】また、第１の実施の形態に係る印刷システムのレーザープリンタ３の内部構成を図２に基づき説明すると、レーザプリンタ３は、ＣＰＵ１０と、ＲＡＭ１１と、ＲＯＭ１２と、セントロニクスポート１３と、紙搬送装置１４と、転写装置１５と、メインバス１６とを備える構成となっている。

【００２３】上記各部の構成を詳述すると、ＣＰＵ１０は、プログラムに基づきレーザープリンタ各部を制御する。ＲＡＭ１１は、ワークエリアとして使用される。ＲＯＭ１２は、プログラムを格納するものであり、ＲＯＭ１２の代わりにフロッピーディスク，ＣＤＲＯＭ，ハードディスク等を使用してもよい。セントロニクスポート１３は、セントロニクス線２から印字データ・各種命令・制御チャネル開始識別信号・制御チャネル終了識別信号等を取り込む。紙搬送装置１４は、レーザープリンタ内部で印字用紙の搬送を制御する。転写装置１５は、印字用紙に印字動作を行う機構を制御する。メインバス１６は、共通信号路である。

【００２４】尚、第１の実施の形態では特に断らない限り、パーソナルコンピュータ１では、ＣＰＵ４がメインバス９を介してＲＡＭ５，ハードディスク６，ユーザーコマンド入力装置７，セントロニクスポート８を制御し、レーザープリンタ３では、ＣＰＵ１０は、メインバス１５を介してＲＡＭ１１，ＲＯＭ１２，セントロニクスポート１３，紙搬送装置１４，転写装置１５を制御する。

【００２５】第１の実施の形態では、パーソナルコンピュータ１とレーザープリンタ３とを接続するセントロニクス線２上に論理チャネルを２本設定しており、図４はその一例を示す概略図である。パーソナルコンピュータ１の制御信号は、論理チャネル振り分け装置１７を介してセントロニクス線２の制御信号送信用論理チャネルＣ１へ送出され、レーザープリンタ３の論理チャネル判定装置１８を介して第１メモリ１９に記憶される。また、パーソナルコンピュータ１の印字データは、論理チャネル振り分け装置１７を介してセントロニクス線２のデータ送信用論理チャネルＣ２へ送出され、レーザープリンタ３の論理チャネル判定装置１８を介して第２メモリ２０に記憶される。

【００２６】また、第１の実施の形態においては、パーソナルコンピュータ１側のプログラムは、印字データ送出部プログラムとユーザー割り込み処理部プログラムとに分かれている。パーソナルコンピュータ１のＲＡＭ５

上に存在する送信状態ＦＬＧ（フラグ）は、基本的にはユーザー割り込み処理部プログラムが操作者からの割り込み処理を受信したときに書き換え、印字データ送出部プログラムがそれを参照して様々な処理を実行するようになっている。

【００２７】次に、前記印字データ送出部プログラムを図５に基づき説明する。操作者は印刷システムを立ち上げた後（ステップＳ１０１）、アプリケーションを用いて印字したいデータを作成する（ステップＳ１０２）。尚、印字データ作成方法に関しては本発明の本質とは関係無いため説明は省略する。操作者がパーソナルコンピュータ１のユーザーコマンド入力装置７に装備されている印字要求ボタンを押下すると（ステップＳ１０３）、プリンタドライバはアプリケーションからの印字データに基づき、印字を実行するレーザープリンタ３に対応した印字データの作成を開始する（ステップＳ１０４）。プリンタドライバが印字データの作成を終了すると（ステップＳ１０５）、レーザープリンタ３へデータを送信するプリンタスーブラに印字データを送信する（ステップＳ１０６）。

【００２８】プリンタスーブラは受信した印字データの内、先頭１バイトの印字データを、セントロニクスのプロトコルを使用してセントロニクスポート８からレーザープリンタ３へ送信を開始する（ステップＳ１０７）。プリンタスーブラはＲＡＭ５上に存在する送信状態ＦＬＧをＣＯＮＴＩＮＵＥに設定する（ステップＳ１０８）。ここで、プリンタスーブラはまだ送信すべき印字データが有るか否かを調べ（ステップＳ１１０）、送信すべき印字データが無い場合は印字データの送信が全て終了したと判断し、送信状態ＦＬＧをＷＡＩＴにセットし（ステップＳ１２３）、本処理を終了する（ステップＳ１２４）。

【００２９】他方、プリンタスーブラは未送出のデータが有る場合は送信状態ＦＬＧを調べ（ステップＳ１１１）、送信状態ＦＬＧがＣＯＮＴＩＮＵＥである場合は、上記ステップＳ１０９へ戻り印字データ送信を続行し、送信状態ＦＬＧがＣＯＮＴＩＮＵＥでない場合は、操作者による印字停止命令が発行されたと認識し、レーザープリンタ３に対して制御チャネル開始識別信号をセントロニクスポート８から出力し（ステップＳ１１２）、続いて印字停止命令をセントロニクスポート８から出力する（ステップＳ１１３）。

【００３０】尚、制御チャネル開始識別信号とは１バイトの信号であり、この後、制御チャネル終了識別信号を送信するまでは、制御関連の論理チャネルに関する信号を送信することになる。また、この１バイトの制御チャネル開始識別信号と同じ値は、印字データ内には存在しないものとする。画像データ等で制御チャネル開始識別信号と同じ値が出てきたときは、印字データの作成時にダミービットを挿入して制御チャネル開始識別信号と区別する等の識別処理を施す。

【００３１】プリンタスーブラは送信状態ＦＬＧがＤＩＳＣＡＲＤであるか否かを調べ（ステップＳ１１４）、送信状態ＦＬＧがＤＩＳＣＡＲＤである場合は、操作者による印字中止命令が発行されたと認識し、レーザープリンタ３に対して印字データＲＥＳＥＴ命令をセントロニクスポート８から出力し（ステップＳ１２０）、それに続いて制御チャネル終了識別信号をセントロニクスポート８から出力する（ステップＳ１２１）。この後、プリンタスーブラが現在保持している未送出の印字データを破棄し（ステップＳ１２２）、送信状態ＦＬＧをＷＡＩＴにセットし（ステップＳ１２３）、本処理を終了する（ステップＳ１２４）。

【００３２】他方、プリンタスーブラは送信状態ＦＬＧがＤＩＳＣＡＲＤでない場合は、一定時間、操作者の新たな命令を待機する（ステップＳ１１５）。一定時間後、送信状態ＦＬＧがＳＴＯＰである場合は（ステップＳ１１６の答が肯定）、ユーザー命令入力がなかったと判断し、再度ステップＳ１１４の処理を行う。送信状態ＦＬＧがＳＴＯＰでない場合は（ステップＳ１１６の答が否定）、送信状態ＦＬＧがＣＯＮＴＩＮＵＥであるか否かを調べる（ステップＳ１１７）。

【００３３】プリンタスーブラは送信状態ＦＬＧがＣＯＮＴＩＮＵＥである場合は、操作者からの印字再開命令があったと判断し、レーザープリンタ３に対して印字再開命令を送出し（ステップＳ１１８）、続いて制御チャネル終了識別信号を送出し（ステップＳ１１９）、上記ステップＳ１０９へ戻り印字データ送出処理を再開する。送信状態ＦＬＧがＣＯＮＴＩＮＵＥでない場合は、ステータス（動作状態）異常が発生したと認識し、上記ステップＳ１２０へ移行する。

【００３４】次に、パーソナルコンピュータ１（ホストコンピュータ）側の割り込み処理の動作について図６に基づき詳細に説明する。操作者からの割り込みのトリガは、ユーザーコマンド入力装置７（キーボードまたはマウス等）から入力され、対応した割り込みハンドラに通知される。尚、操作者が通知可能な本実施の形態に関する命令は、印字中断、印字再開、印字中止の３つである。

【００３５】ユーザーコマンド入力装置７により操作者による割り込みが発生すると（ステップＳ２０１）、その割り込み要因を取得し（ステップＳ２０２）、ＲＡＭ５上に格納する。次いで、現在のＲＡＭ５上の送信状態ＦＬＧを参照し（ステップＳ２０３）、送信状態ＦＬＧがＷＡＩＴでない場合は（ステップＳ２０３の答が否定）、現在プリンタスーブラが印字データ送信中（中断中も含む）と判断し、上記ステップＳ２０２で取得した割り込み要因を参照する。

【００３６】割り込み要因が印字中断である場合は（ステップＳ２０４の答が肯定）、送信状態ＦＬＧをＳＴＯ

Ｐに設定し（ステップＳ２０８）、本処理を終了する（ステップＳ２１９）。割り込み要因が印字再開である場合は（ステップＳ２０５の答が肯定）、送信状態ＦＬＧをＣＯＮＴＩＮＵＥに設定し（ステップＳ２０９）、本処理を終了する（ステップＳ２１４）。割り込み要因が印字中止である場合は（ステップＳ２０６の答が肯定）、送信状態ＦＬＧをＤＩＳＣＡＲＤに設定し（ステップＳ２１０）、本処理を終了する（ステップＳ２１９）。

【００３７】送信状態ＦＬＧがＷＡＩＴである場合は（ステップＳ２０３の答が肯定）、プリンタスープラによる印字データ送信は全て完了していると判断し、割り込みハンドラ自身がレーザープリンタ３に対して制御命令を送信する。そこで、レーザープリンタ３に対してセントロニクスポート８を介して制御チャネル開始識別信号を送信し（ステップＳ２０７）、上記ステップＳ２０２で取得した割り込み要因を参照する。

【００３８】割り込み要因が印字中断である場合は（ステップＳ２１１の答が肯定）、レーザープリンタ３に対して印字停止命令を送出し（ステップＳ２１４）、ステップＳ２１８を実行する。割り込み要因が印字再開である場合は（ステップＳ２１２の答が肯定）、レーザープリンタ３に対して印字再開命令を送出し（ステップＳ２１５）、ステップＳ２１８を実行する。割り込み要因が印字中止である場合は（ステップＳ２１３）、レーザープリンタ３に対して印字停止命令を送出し（ステップＳ２１６）、続いて印字データＲＥＳＥＴ命令を送出し（ステップＳ２１７）、ステップＳ２１８を実行する。ステップＳ２１８ではレーザープリンタ３に対して制御チャネル終了識別信号を送出し、本処理を終了する（ステップＳ２１９）。

【００３９】次に、レーザープリンタ３（印字装置）側のメインのプログラムの動作について図７に基づき説明する。レーザープリンタ３側では、印字処理（印字制御、ラスタライズ、紙搬送制御等）はメインのプログラムで行い、割り込みハンドラによりセントロニクスポート１３を介してパーソナルコンピュータ１からのデータ受信処理を行う。基本的にはメインプログラムが印字ステータスを参照して実行すべき処理を決定する。また、割り込みハンドラはパーソナルコンピュータ１から受信した命令を印字ステータスを更新することにより、メインプログラムに通知する。

【００４０】電源が投入されると（ステップＳ３０１）、レーザープリンタ３は処理を開始して当該レーザープリンタ自身を初期化し（ステップＳ３０２）、ＲＡＭ１１上の印字ステータスを印字実行に設定する（ステップＳ３０３）。次いで、ＲＡＭ１１上の印字データ格納領域である第２メモリ２０（図４参照）に印字すべき印字データが格納されているか否かを調べる（ステップＳ３０４）。印字すべきデータがない場合は、再度ステップＳ３０４を実行する。

【００４１】印字すべきデータがある場合は、ＲＡＭ１１上の印字ステータスが印字実行か否かを調べる（ステップＳ３０５）。印字ステータスが印字実行である場合は、次の印字すべきページの印字処理を実行する（ステップＳ３０６）。そして、当該ページの印字した紙の排紙が正常に終了した時点で（ステップＳ３０７）、印字処理を終了したＲＡＭ１１上の第２メモリ２０上の印字データを削除し（ステップＳ３０８）、再度ステップＳ３０４を実行する。

【００４２】上記ステップＳ３０５において、印字ステータスが印字実行でない場合は、印字ステータスが印字リセットであるか否かを調べる（ステップＳ３０９）。印字ステータスが印字リセットである場合は、ＲＡＭ１１上の印字データ格納領域である第２メモリ２０内のデータを全て破棄する（ステップＳ３１０）。そして、レーザープリンタ３を初期化し（ステップＳ３１１）、初期化が終了すると、印字ステータスを実行に設定し（ステップＳ３１２）、再度ステップＳ３０４を実行する。

【００４３】上記ステップＳ３０９において、印字ステータスが印字リセットでない場合は、印字ステータスが印字中断か否かを調べる（ステップＳ３１３）。印字ステータスが印字中断である場合は、次のユーザーコマンドを取得すべくステップＳ３０５を実行する。印字ステータスが印字中断でない場合は、ステータス異常と判断し、ＲＡＭ１１上の印字データ格納領域である第２メモリ２０内のデータを全て破棄し、レーザープリンタ３を初期化する（ステップＳ３１４）。初期化が終了すると、印字ステータスを実行に設定し（ステップＳ３１５）、再度ステップＳ３０４を実行する。

【００４４】次に、レーザープリンタ３（印字装置）の割り込みハンドラの動作について図８に基づき説明する。割り込みハンドラはレーザープリンタ３の初期化の完了時にスタートし（ステップＳ４０１）、パーソナルコンピュータ１（ホストコンピュータ）からの割り込みを待機する（ステップＳ４０２）。割り込みが発生すると、セントロニクスポート１３を介してセントロニクス線２のｎＳＴＲＯＢがＯＦＦになったか否かを調べる（ステップＳ４０３）。

【００４５】ＯＦＦになっていない場合は、それぞれの割り込みに対応した処理を実行する（ステップＳ４０５）。ＯＦＦになった場合は、セントロニクスポート１３を介してセントロニクス線２のＢＵＳＹをＨＩＧＨにし（ステップＳ４０４）、パーソナルコンピュータ１からの更なる割り込みを拒否し、セントロニクスポート１３を介してセントロニクス線２のＤＡＴＡラインからデータを取り込む（ステップＳ４０６）。そして、当該データが制御チャネルのデータか否かを判断する（ステップＳ４０７）。この場合、データが制御チャネル開始識別子と終了識別子とによって挟まれた区間のデータか

否かで判断する。

【００４６】取り込んだデータが制御チャネルのデータでない場合は、通常の印字データと判断し、ＲＡＭ１１上の第２メモリ２０に格納する（ステップＳ４０８）。そして、第２メモリ２０にまだ印字データを格納可能な空きが有るか否かを調べる（ステップＳ４０９）。第２メモリ２０に空きが無い場合は、一定時間待機して再度ステップＳ４０９を実行する。第２メモリ２０に空きが有る場合は、セントロニクス線２のＢＵＳＹをＬＯＷにし（ステップＳ４１０）、パーソナルコンピュータ１からの次の割り込み受付可能である旨を当該コンピュータ１へ通知する。この後、セントロニクスポート１３を介してセントロニクス線２のｎＡＣＫを送信して（ステップＳ４１１）、１バイトのデータ受信処理完了を通知し、次のデータを受信すべく再度ステップＳ４０２を実行する。

【００４７】他方、取り込んだデータが制御チャネルのデータである場合は、制御命令のデータと判断し、ＲＡＭ１１上の第１メモリ１９（図４参照）に格納する（ステップＳ４１２）。そして、第１メモリ１９にまだ制御命令データを格納可能な空きがあるか否かを調べる（ステップＳ４１３）。第１メモリ１９に空きが無い場合は、一定時間待機して再度ステップＳ４１３を実行する。第１メモリ１９に空きが有る場合は、セントロニクス線２のＢＵＳＹをＬＯＷにし（ステップＳ４１４）、パーソナルコンピュータ１からの次の割り込み受付可能である旨を当該コンピュータ１へ通知する。この後、セントロニクスポート１３を介してセントロニクス線２のｎＡＣＫを送信し、１バイトのデータ受信処理完了を通知する（ステップＳ４１５）。

【００４８】データ受信処理完了の通知後、第１メモリ１９に格納した制御命令が印字停止命令であるか否かを調べる（ステップＳ４１６）。制御命令が印字停止命令である場合は、メインに通知すべく印字ステータスを印字中断に設定し（ステップＳ４１７）、設定終了後、第１メモリ１９の印字停止命令をクリアし（ステップＳ４２３）、ステップＳ４０２を実行する。

【００４９】上記ステップＳ４１６において、第１メモリ１９に格納した制御命令が印字停止命令でない場合は、第１メモリ１９に格納した制御命令が印字ＲＥＳＥＴ命令であるか否かを調べる（ステップＳ４１８）。制御命令が印字ＲＥＳＥＴ命令である場合は、メインに通知すべく印字ステータスを印字ＲＥＳＥＴに設定し（ステップＳ４１９）、設定終了後、第１メモリ１９の印字ＲＥＳＥＴ命令をクリアし（ステップＳ４２３）、ステップＳ４０２を実行する。

【００５０】上記ステップＳ４１６において、第１メモリ１９に格納した制御命令が印字ＲＥＳＥＴ命令でない場合は、第１メモリ１９に格納した制御命令が印字再開命令であるか否かを調べる（ステップＳ４２０）。制御命令が印字再開命令である場合は、メインに通知すべく印字ステータスを印字再開に設定し（ステップＳ４２１）、設定終了後、第１メモリ１９の印字再開命令をクリアし（ステップＳ４２３）、ステップＳ４０２を実行する。

【００５１】上記ステップＳ４１６において、第１メモリ１９に格納した制御命令が印字再開命令でない場合は、ステータス異常が発生したと認識し、印字ステータスを印字ＲＥＳＥＴに設定し（ステップＳ４２２）、設定終了後、ステップＳ４０２を実行する。

【００５２】上述したように、第１の実施の形態によれば、印刷システムの操作者はパーソナルコンピュータ１のユーザーコマンド入力装置７を介してレーザープリンタ３に対し印字の中断または中止を指示した際に、レーザープリンタ３の印字処理を即座に中断または中止できるため、無駄な印字を行わなくて済み、用紙やトナーの無駄を解消することができると共に、レーザープリンタ３の解放も即座に可能となる。また、第１の実施の形態による方法を採用することにより、パーソナルコンピュータ１及びレーザープリンタ３ともに新たなハードウエアを追加しなくてもよいという利点がある。また、使用するハードウエアのポート設定も従来のままで実現することが可能である。

【００５３】（２）第２の実施の形態

第２の実施の形態は、上記第１の実施の形態においてセントロニクス線２のデータラインを使用し制御コマンドを送出する方法に代えて、セントロニクス線２のコントロールラインの未使用のＢＩＴ番号（５～７）を使用して印字停止命令、印字再開命令、印字中止命令をレーザープリンタ３へ通知するようにしたものである。コントロールラインＢＩＴ５～７の制御方法は、セントロニクス線２のｎＳＴＲＯＢ等での個々のビット制御方法と同様であるため詳細は省略する。

【００５４】図９はセントロニクス制御のコントロールバイトの制御命令の２つの定義例を示す図である。例１では印刷中断命令はＢＩＴ５をＯＮ、印刷再開命令はＢＩＴ６をＯＮ、印刷中止命令はＢＩＴ７をＯＮとする。また、例２では印刷中断命令はＢＩＴ５をＯＦＦ（中断中はＢＩＴ５を常にＯＦＦし、ＯＮになった時点でレーザープリンタ３は印刷中止命令が無い限り中断命令解除と認識する）、印刷再開命令はＢＩＴ５をＯＮ、印刷中止命令はＢＩＴ６をＯＮとする。尚、印刷中止命令はコントロールラインのｎＩＮＩＴで代用する方法もある。

【００５５】第２の実施の形態においてパーソナルコンピュータ１からレーザープリンタ３に対する各命令の制御信号送出方法は、各ビット（ＤＥＦＡＵＬＴレベルＯＦＦ）に対しＨＩＧＨにして一定時間後ＯＦＦにすることにより、パルス状態の信号を送出する。第２の実施の形態に係るシステム構成、内部ブロック構成、及び動作の詳細は上記第１の実施の形態とほぼ同様であるた

め、下記に相異点のみ説明する。

【００５６】第２の実施の形態では、コントロールラインを使用するため、論理チャネルを設定する必要が無いので、パーソナルコンピュータ１における動作の内、図５のステップＳ１１２、Ｓ１１９、Ｓ１２２、図６のステップＳ２０７、Ｓ２１８に係る動作“レーザープリンタに対して制御チャネル開始識別子を送出”及び“レーザープリンタに対して制御チャネル終了識別子を送出”が不要となる。

【００５７】また、第２の実施の形態では、レーザープリンタ３側ではコントロールラインＢＩＴ５～７の状態を割り込みコントローラが常時監視しており、信号線の状態に変化があった場合、そのトリガにして割り込みハンドラを動作させる。

【００５８】また、第２の実施の形態では、制御命令は印字データとは物理的に別の線を使用するため、レーザープリンタ３の割り込みハンドラの動作の内、図８のステップＳ４１２からステップＳ４１５までが不要であり、ステップＳ４０３の前において“コントロールラインのＢＩＴ５～７に変化があったか”を判定し、判定結果がｙｅｓの場合はステップＳ４１６を実行し、判定結果がｎｏの場合はステップＳ４０３を実行する。

【００５９】上述したように、第２の実施の形態によれば、上記第１の実施の形態と比較し使用するハードウエアのポート設定は変更しなければならない可能性は発生するが、コントロールラインのＢＩＴ５～７のみを制御するドライバＤＬＬを別に作成して実現できるため、従来のセントロニクスを利用したデータ送出プログラムに対する変更は、上記第１の実施の形態と比較して少なくて済み、これにより、開発に要する時間を短縮することができる。また、レーザープリンタ３がメモリフル状態で印字データを受信できない場合でも、レーザープリンタ３における印字処理の中断や中止が可能である。

【００６０】（３）第３の実施の形態

先ず、第３の実施の形態に係る印刷システムの全体構成を図１２に基づき説明すると、本印刷システムは、ホストコンピュータとしてのパーソナルコンピュータ２１と、該パーソナルコンピュータ２１にセントロニクス線２２ａ，制御線２２ｂを介して接続された印字装置としてのレーザープリンタ２３とを備える構成となっている。

【００６１】次に、第３の実施の形態に係る印刷システムのパーソナルコンピュータ２１の内部構成を図１０に基づき説明すると、パーソナルコンピュータ２１は、ＣＰＵ２４と、ＲＡＭ２５と、ハードディスク２６と、ユーザーコマンド入力装置２７と、セントロニクスポート２８と、制御信号送出装置２９と、メインバス３０とを備える構成となっている。

【００６２】上記各部の構成を詳述すると、ＣＰＵ２４は、プログラムに基づきパーソナルコンピュータ各部を制御する。ＲＡＭ２５は、ワークエリアとして使用される。ハードディスク２６は、プログラムを格納するものであり、ハードディスク２６の代わりにフロッピーディスク，ＣＤＲＯＭ等を使用してもよい。ユーザーコマンド入力装置２７は、操作者が各種コマンドを入力するためのものであり、具体的にはマウスやキーボード等から構成される。セントロニクスポート２８は、セントロニクス線２２ａを介してレーザープリンタ２３へ印字データ等を出力する。制御信号送出装置２９は、制御線２２ｂを介してレーザープリンタ２３へ制御信号を出力する。メインバス３０は、共通信号路である。

【００６３】また、第３の実施の形態に係る印刷システムのレーザープリンタ２３の内部構成を図１１に基づき説明すると、レーザプリンタ２３は、ＣＰＵ３１と、ＲＡＭ３２と、ＲＯＭ３３と、セントロニクスポート３４と、紙搬送装置３５と、転写装置３６と、電磁波信号受信装置３７と、メインバス３８とを備える構成となっている。

【００６４】上記各部の構成を詳述すると、ＣＰＵ３１は、プログラムに基づきレーザープリンタ各部を制御する。ＲＡＭ３２は、ワークエリアとして使用される。ＲＯＭ３３は、プログラムを格納するものであり、ＲＯＭ３３の代わりにフロッピーディスク，ＣＤＲＯＭ，ハードディスク等を使用してもよい。セントロニクスポート３４は、セントロニクス線２２ａから印字データを取り込む。紙搬送装置３５は、レーザープリンタ内部で印字用紙の搬送を制御する。転写装置３６は、印字用紙に印字動作を行う機構を制御する。電磁波信号受信装置３７は、制御線２２ｂから電磁波信号を受信する。メインバス３８は、共通信号路である。

【００６５】尚、第３の実施の形態では特に断らない限り、パーソナルコンピュータ２１では、ＣＰＵ２４がメインバス３０を介してＲＡＭ２５，ハードディスク２６，ユーザーコマンド入力装置２７，セントロニクスポート２８，制御信号送出装置２９を制御し、レーザープリンタ２３では、ＣＰＵ３１は、メインバス３８を介してＲＡＭ３２，ＲＯＭ３３，セントロニクスポート３４，紙搬送装置３５，転写装置３６，電磁波信号受信装置３７を制御する。

【００６６】第３の実施の形態に係る印刷システムの動作は、上記第２の実施の形態に係る印刷システムとほぼ同様であり、制御命令の送出方法のみが相異するため、下記に相異点のみ説明する。

【００６７】パーソナルコンピュータ２１側では、制御命令送出要求の発生時に、送出命令と当該命令の種類（印字停止命令、印字再開命令、印字ＲＥＳＥＴ命令）を制御信号送出装置２９へ送出する。制御命令送出要求を受信した制御信号送出装置２９は、要求された制御命令を送出する。制御命令の送出方法としては下記の３つの方法が考えられる。

【００６８】（ｉ）レーザープリンタ２３とパーソナルコンピュータ２１とに信号伝達用の物理線が３本以上ある時。この場合は、図９の例１のコントロール線のＢＩＴ５～７を利用した命令の定義方法と同じ定義方法により各命令と物理線を定義し、その定義に従って制御信号送出装置２９が命令を送出する方法である。

【００６９】（ｉｉ）レーザープリンタ２３とパーソナルコンピュータ２１とに信号伝達用の物理線が２本以上ある時。この場合は、図９の例２のコントロール線のＢＩＴ５～６を利用した命令の定義方法と同じ定義方法により各命令と物理線を定義し、その定義に従って制御信号送出装置２９が命令を送出する方法である。

【００７０】（ｉｉｉ）レーザープリンタ２３とパーソナルコンピュータ２１とに信号伝達用の物理線が１本以上、信号伝達を行う際の同期を取るための同期信号が流れている線が１本以上ある時。図１３はその時の信号と各命令の定義例である。この場合は、制御信号送出装置２９は常時同期信号を送出している。

【００７１】レーザープリンタ２３側では、電磁波信号受信装置３７は常時、パーソナルコンピュータ２１の制御信号送出装置２９から送出されている同期信号を受信し、制御信号送出装置２９と同期を取っている。そして、制御信号線２２ｂのレベルに変化があった時、そのレベル変化から図１３の定義に従って何れの制御命令であるかを解析し、その解析結果を印字ステータスに反映する。

【００７２】上述したように、第３の実施の形態によれば、制御命令の通知はセントロニクスポートを使用しなくとも行うことができるため、セントロニクスのポートを操作するドライバを変更する必要が無いという利点がある。また、レーザープリンタ２３がメモリフル状態で印字データを受信できない場合でも、レーザープリンタ２３の印字処理の中断または中止が可能である。

【００７３】（４）第４の実施の形態

先ず、第４の実施の形態に係る印刷システムの全体構成を図１６に基づき説明すると、本印刷システムは、ホストコンピュータとしてのパーソナルコンピュータ４１と、該パーソナルコンピュータ４１から無線が送信される印字装置としてのレーザープリンタ４２とを備える構成となっている。

【００７４】次に、第４の実施の形態に係る印刷システムのパーソナルコンピュータ４１の内部構成を図１４に基づき説明すると、パーソナルコンピュータ４１は、ＣＰＵ４３と、ＲＡＭ４４と、ハードディスク４５と、ユーザーコマンド入力装置４６と、セントロニクスポート４７と、電磁波信号発射装置４８と、メインバス４９とを備える構成となっている。

【００７５】上記各部の構成を詳述すると、ＣＰＵ４３は、プログラムに基づきパーソナルコンピュータ各部を制御する。ＲＡＭ４４は、ワークエリアとして使用される。ハードディスク４５は、プログラムを格納するものであり、ハードディスク４５の代わりにフロッピーディスク，ＣＤＲＯＭ等を使用してもよい。ユーザーコマンド入力装置４６は、操作者が各種コマンドを入力するためのものであり、具体的にはマウスやキーボード等から構成される。セントロニクスポート４７は、印字データ等を出力する。電磁波信号発射装置４８は、レーザープリンタ４２へ電磁波信号を発射する。メインバス３０は、共通信号路である。

【００７６】また、第４の実施の形態に係る印刷システムのレーザープリンタ４２の内部構成を図１５に基づき説明すると、レーザプリンタ４２は、ＣＰＵ５０と、ＲＡＭ５１と、ＲＯＭ５２と、セントロニクスポート５３と、紙搬送装置５４と、転写装置５５と、制御信号受信装置５６と、メインバス５７とを備える構成となっている。

【００７７】上記各部の構成を詳述すると、ＣＰＵ５０は、プログラムに基づきレーザープリンタ各部を制御する。ＲＡＭ５１は、ワークエリアとして使用される。ＲＯＭ５２は、プログラムを格納するものであり、ＲＯＭ５２の代わりにフロッピーディスク，ＣＤＲＯＭ，ハードディスク等を使用してもよい。セントロニクスポート５３は、印字データ等を取り込む。紙搬送装置５４は、レーザープリンタ内部で印字用紙の搬送を制御する。転写装置５５は、印字用紙に印字動作を行う機構を制御する。制御信号受信装置５６は、制御信号を受信する。メインバス５７は、共通信号路である。

【００７８】尚、第４の実施の形態では特に断らない限り、パーソナルコンピュータ４１では、ＣＰＵ４３がメインバス４９を介してＲＡＭ４４，ハードディスク４５，ユーザーコマンド入力装置４６，セントロニクスポート４７，電磁波信号発射装置４８を制御し、レーザープリンタ４２では、ＣＰＵ５０は、メインバス５７を介してＲＡＭ５１，ＲＯＭ５２，セントロニクスポート５３，紙搬送装置５４，転写装置５５，制御信号受信装置５６を制御する。

【００７９】第４の実施の形態は、動作の詳細は上記第３の実施の形態とほぼ同様であり、制御命令の送出方法のみが相異する。上記第３の実施の形態では物理線を使用してパーソナルコンピュータからレーザープリンタへ通知する方法をとったが、第４の実施の形態では電磁波を使用してパーソナルコンピュータ４１からレーザープリンタ４２へ通知する方法をとっている。電磁波の発射方法及び電磁波の受信方法は公知技術であるため説明は省略する。尚、信号の定義方法は上記図１３に示した方法と同じである。

【００８０】上述したように、第４の実施の形態によれば、上記第３の実施の形態における効果に加えて、レーザープリンタ４２とパーソナルコンピュータ４１との物理的位置関係の制約を緩くすることができるという利点

がある。

【００８１】尚、本発明は、複数の機器から構成されるシステムに適用しても、１つの機器からなる装置に適用しても良い。また、本発明は、システム或は装置にプログラムを供給することによって達成される場合にも適用できることは言うまでもない。この場合、本発明を達成するためのソフトウエアによって表されるプログラムを格納した記憶媒体を該システム或は装置に読み出すことによって、そのシステム或は装置が、本発明の効果を享受することが可能となる。

【００８２】

【発明の効果】以上説明したように、請求項１の発明によれば、ホストコンピュータは、印字装置に対して印字処理の中断あるいは再開あるいは印字データの破棄を指示するコマンドを入力するための入力手段と、入力されたコマンドを印字装置へ即時に送信する送信手段とを具備し、印字装置は、ホストコンピュータから受信したコマンドの種類を判別する判別手段と、受信コマンドが中断指示コマンドと判別された場合に印字処理実行中の該当頁の印字処理を完了させると共に次頁の印字処理を中断させ，受信コマンドが再開指示コマンドと判別された場合に中断中の印字処理を再開させ，受信コマンドが破棄指示コマンドと判別された場合に印字装置内の未印字の全印字データを破棄し、新規の印字命令に備える制御手段とを具備しているため、無駄な印字を行わなくて済み、用紙やトナーの無駄を解消することができる。また、ホストコンピュータに対する印字装置の解放も即座に可能となると共に、ホストコンピュータ及び印字装置ともに新たなハードウエアを追加しなくてもよいという利点がある。

【００８３】請求項２の発明によれば、請求項１記載の印刷システムにおいて、送信手段は、電磁波を使用して送信するため、請求項１の発明と同様の効果を奏すると共に、印字装置とホストコンピュータとの物理的位置関係の制約が緩くなるという利点がある。

【００８４】請求項３の発明によれば、請求項１記載の印刷システムにおいて、送信手段は、ホストコンピュータと印字装置との間における通常の印字データの転送に用いるライン以外のラインを介して送信するため、請求項１の発明と同様の効果を奏すると共に、ホストコンピュータから印字装置に対するコマンドをより一層即時に送信することが可能となる。

【００８５】請求項４の発明によれば、請求項１記載の印刷システムにおいて、送信手段は、ホストコンピュータと印字装置との間における通常の印字データの転送に用いるセントロニクスラインの未使用のコントロールバイトを使用して送信するため、請求項１の発明と同様の効果を奏すると共に、セントロニクスを利用したデータ送出プログラムに対する変更は比較的少なくて済み開発に要する時間を短縮することが可能となる。

【００８６】請求項５の発明によれば、請求項１記載の印刷システムにおいて、送信手段は、ホストコンピュータと印字装置との間における通常の印字データの転送に用いるセントロニクスラインのデータバイトの物理チャネル上に論理チャネルを設定し、前記論理チャネル上で前記コマンドの送信を行うため、請求項１の発明と同様の効果を奏すると共に、セントロニクスのポートを使用しなくともコマンドを送信でき、これにより、セントロニクスのポートを操作するハードウエアを変更することが不要となる。

【００８７】請求項６の発明によれば、請求項１記載の印刷システムにおいて、印字装置は、印字データ記憶装置がフル状態の場合でもホストコンピュータからコマンドの受信が可能な機能を有するため、請求項１の発明と同様の効果を奏すると共に、印字装置がホストコンピュータから印字データを受信できない場合でも印字装置の印字処理の中断が可能となる。

【００８８】請求項７の発明によれば、ホストコンピュータから印字装置に対して印字処理の中断あるいは再開あるいは印字データの破棄を指示するコマンドを入力する行程と、入力されたコマンドを印字装置へ即時に送信する行程と、印字装置がホストコンピュータから受信したコマンドの種類を判別する行程と、受信コマンドが中断指示コマンドと判別された場合に印字処理実行中の該当頁の印字処理を完了させると共に次頁の印字処理を中断させる行程と、受信コマンドが再開指示コマンドと判別された場合に中断中の印字処理を再開させる行程と、受信コマンドが破棄指示コマンドと判別された場合に印字装置内の未印字の全印字データを破棄する行程とを有するため、請求項１の発明と同様に、無駄な印字を行わなくて済み、用紙やトナーの無駄を解消することができる。また、ホストコンピュータに対する印字装置の解放も即座に可能となると共に、ホストコンピュータ及び印字装置ともに新たなハードウエアを追加しなくてもよいという利点がある。

【００８９】請求項８の発明によれば、請求項７記載の印刷制御方法において、入力されたコマンドを印字装置へ即時に送信する行程は、電磁波を使用して行うため、請求項７の発明と同様の効果を奏すると共に、印字装置とホストコンピュータとの物理的位置関係の制約が緩くなるという利点がある。

【００９０】請求項９の発明によれば、請求項７記載の印刷制御方法において、入力されたコマンドを印字装置へ即時に送信する行程は、ホストコンピュータと印字装置との間における通常の印字データの転送に用いるライン以外のラインを介して行うため、請求項７の発明と同様の効果を奏すると共に、ホストコンピュータから印字装置に対するコマンドをより一層即時に送信することが可能となる。

【００９１】請求項１０の発明によれば、請求項７記載

の印刷制御方法において、入力されたコマンドを印字装置へ即時に送信する行程は、ホストコンピュータと印字装置との間における通常の印字データの転送に用いるセントロニクスラインの未使用のコントロールバイトを使用して行うため、請求項７の発明と同様の効果を奏すると共に、セントロニクスを利用したデータ送出プログラムに対する変更は比較的少なくて済み開発に要する時間を短縮することが可能となる。

【００９２】請求項１１の発明によれば、請求項７記載の印刷制御方法において、入力されたコマンドを印字装置へ即時に送信する行程は、ホストコンピュータと印字装置との間における通常の印字データの転送に用いるセントロニクスラインのデータバイトの物理チャネル上に設定された論理チャネル上で前記コマンドの送信を行うため、請求項７の発明と同様の効果を奏すると共に、セントロニクスのポートを使用しなくともコマンドを送信でき、これにより、セントロニクスのポートを操作するハードウエアを変更することが不要となる。

【００９３】請求項１２の発明によれば、請求項７記載の印刷制御方法において、印字装置の印字データ記憶装置がフル状態の場合でもホストコンピュータからコマンドの受信が可能な行程を有するため、請求項７の発明と同様の効果を奏すると共に、印字装置がホストコンピュータから印字データを受信できない場合でも印字装置の印字処理の中断が可能となる。

【図面の簡単な説明】

【図１】本発明の第１の実施の形態に係るパーソナルコンピュータの内部構成を示すブロック図である。

【図２】第１の実施の形態に係るレーザープリンタの内部構成を示すブロック図である。

【図３】第１の実施の形態に係る印刷システムの全体構成を示す説明図である。

【図４】第１の実施の形態に係る２本の論理チャネルを示す説明図である。

【図５】第１の実施の形態に係るパーソナルコンピュータのプリンタスープラの動作を示すフローチャートである。

【図６】第１の実施の形態に係るパーソナルコンピュータ側の割り込み処理の動作を示すフローチャートである。

【図７】第１の実施の形態に係るレーザープリンタ側のメインのプログラムの動作を示すフローチャートである。

【図８】第１の実施の形態に係るレーザープリンタの割り込みハンドラの動作を示すフローチャートである。

【図９】本発明の第２の実施の形態に係るセントロニクス線のコントロールバイトの制御命令の２つの定義例を示す説明図である。

【図１０】本発明の第３の実施の形態に係るパーソナルコンピュータの内部構成を示すブロック図である。

【図１１】第３の実施の形態に係るレーザープリンタの内部構成を示すブロック図である。

【図１２】第３の実施の形態に係る印刷システムの全体構成を示す説明図である。

【図１３】第３の実施の形態に係る信号と各命令の定義例を示す説明図である。

【図１４】本発明の第４の実施の形態に係るパーソナルコンピュータの内部構成を示すブロック図である。

【図１５】第４の実施の形態に係るレーザープリンタの内部構成を示すブロック図である。

【図１６】第４の実施の形態に係る印刷システムの全体構成を示す説明図である。

【符号の説明】

１　パーソナルコンピュータ（ホストコンピュータ）

３、２３、４２　レーザープリンタ（印字装置）

７、２７、４６　ユーザーコマンド入力装置（入力手段）

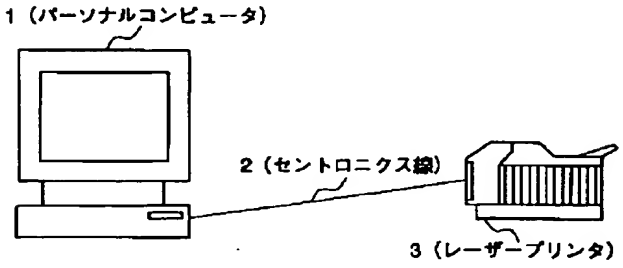
８　セントロニクスポート（送信手段）

１０、３１、５０　ＣＰＵ（判別手段、制御手段）

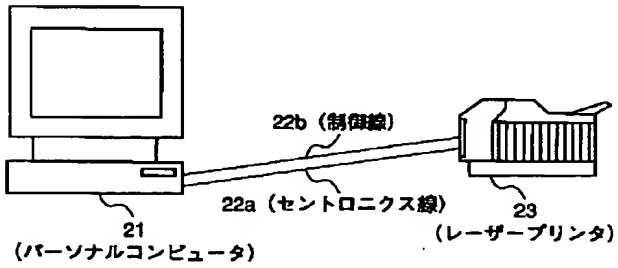
２９　制御信号送出装置（送信手段）

４８　電磁波信号発射装置（送信手段）

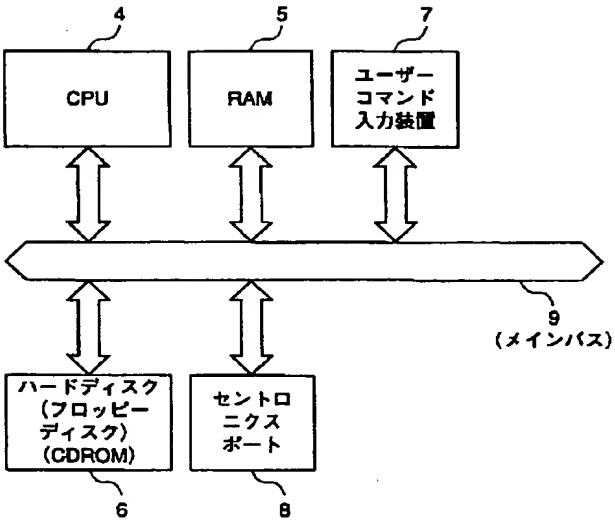
【図３】



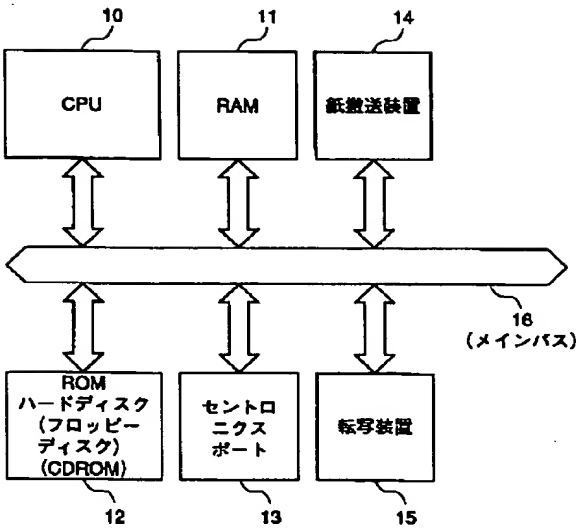
【図１２】



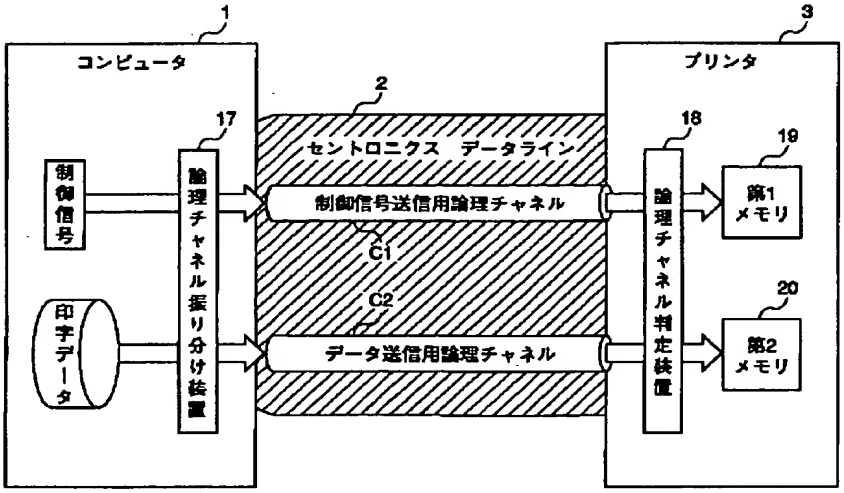
【図１】


4
5
7
CPU
RAM
ユーザー
コマンド
入力装置
9
(メインバス)
ハードディスク
(フロッピー
ディスク)
(CDROM)
セントロ
ニクス
ポート
6
8

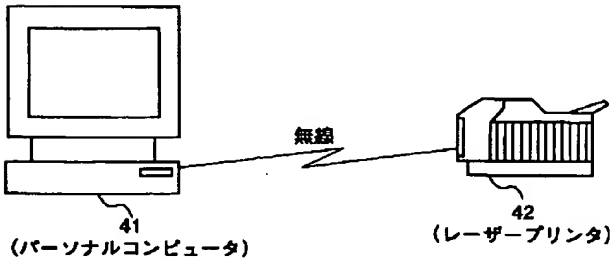
【図２】


10
11
14
CPU
RAM
紙搬送装置
16
(メインバス)
ROM
ハードディスク
(フロッピー
ディスク)
(CDROM)
セントロ
ニクス
ポート
転写装置
12
13
15

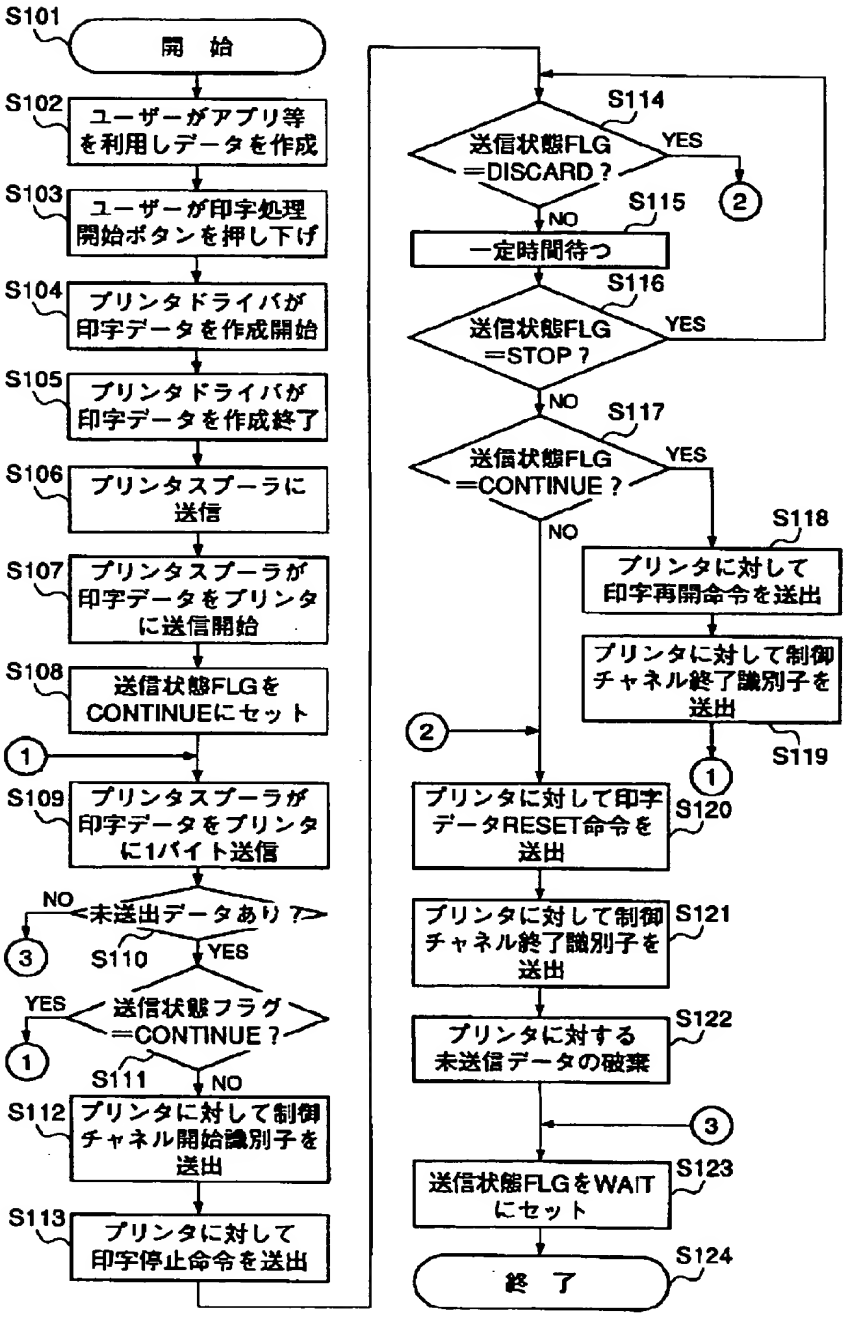
【図４】


1
コンピュータ
3
プリンタ
2
セントロニクス　データライン
17
18
19
制御信号
論理チャネル振り分け装置
制御信号送信用論理チャネル
C1
論理チャネル判定装置
第1
メモリ
C2
20
印字データ
データ送信用論理チャネル
第2
メモリ

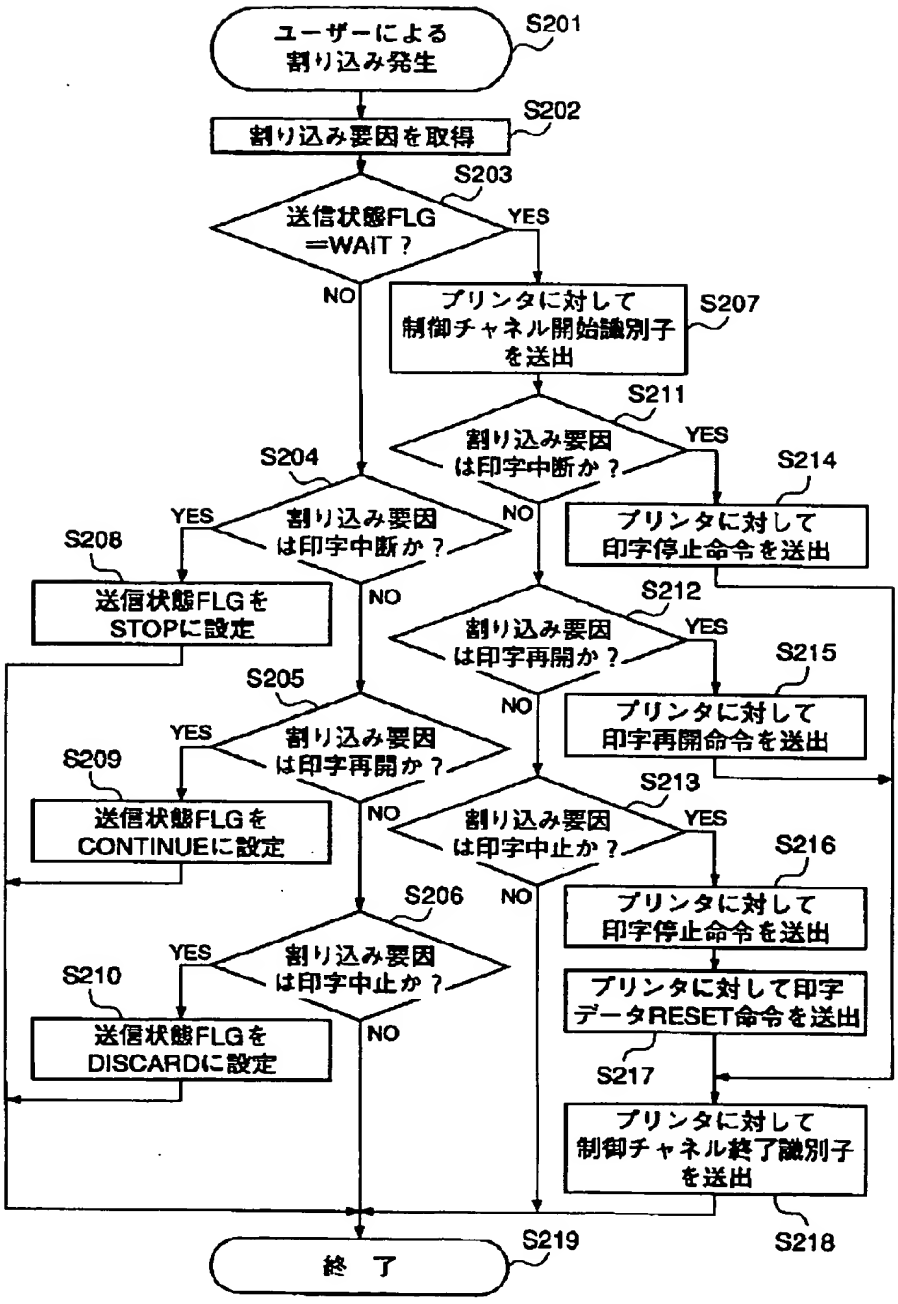
【図１６】


無線
41
(パーソナルコンピュータ)
42
(レーザープリンタ)

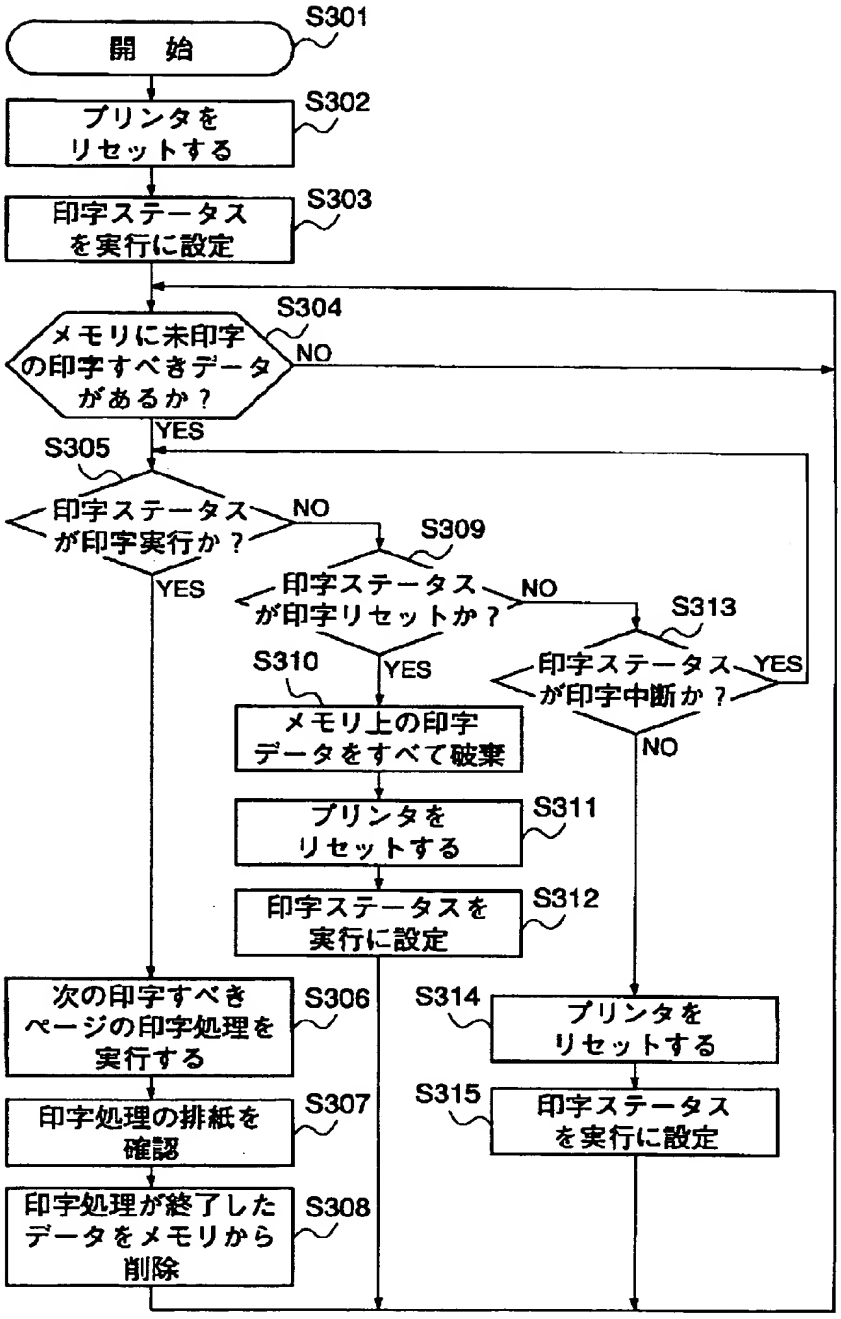
【図５】


S101
開　始
S102
ユーザーがアプリ等を利用しデータを作成
S103
ユーザーが印字処理開始ボタンを押し下げ
S104
プリンタドライバが印字データを作成開始
S105
プリンタドライバが印字データを作成終了
S106
プリンタスプーラに送信
S107
プリンタスプーラが印字データをプリンタに送信開始
S108
送信状態FLGをCONTINUEにセット
1
S109
プリンタスプーラが印字データをプリンタに1バイト送信
NO
未送出データあり？
3
S110
YES
YES
送信状態フラグ＝CONTINUE？
1
S111
NO
S112
プリンタに対して制御チャネル開始識別子を送出
S113
プリンタに対して印字停止命令を送出
S114
送信状態FLG＝DISCARD？
YES
2
S115
NO
一定時間待つ
S116
送信状態FLG＝STOP？
YES
NO
S117
送信状態FLG＝CONTINUE？
YES
NO
S118
プリンタに対して印字再開命令を送出
プリンタに対して制御チャネル終了識別子を送出
S119
2
1
S120
プリンタに対して印字データRESET命令を送出
S121
プリンタに対して制御チャネル終了識別子を送出
S122
プリンタに対する未送信データの破棄
3
S123
送信状態FLGをWAITにセット
S124
終　了

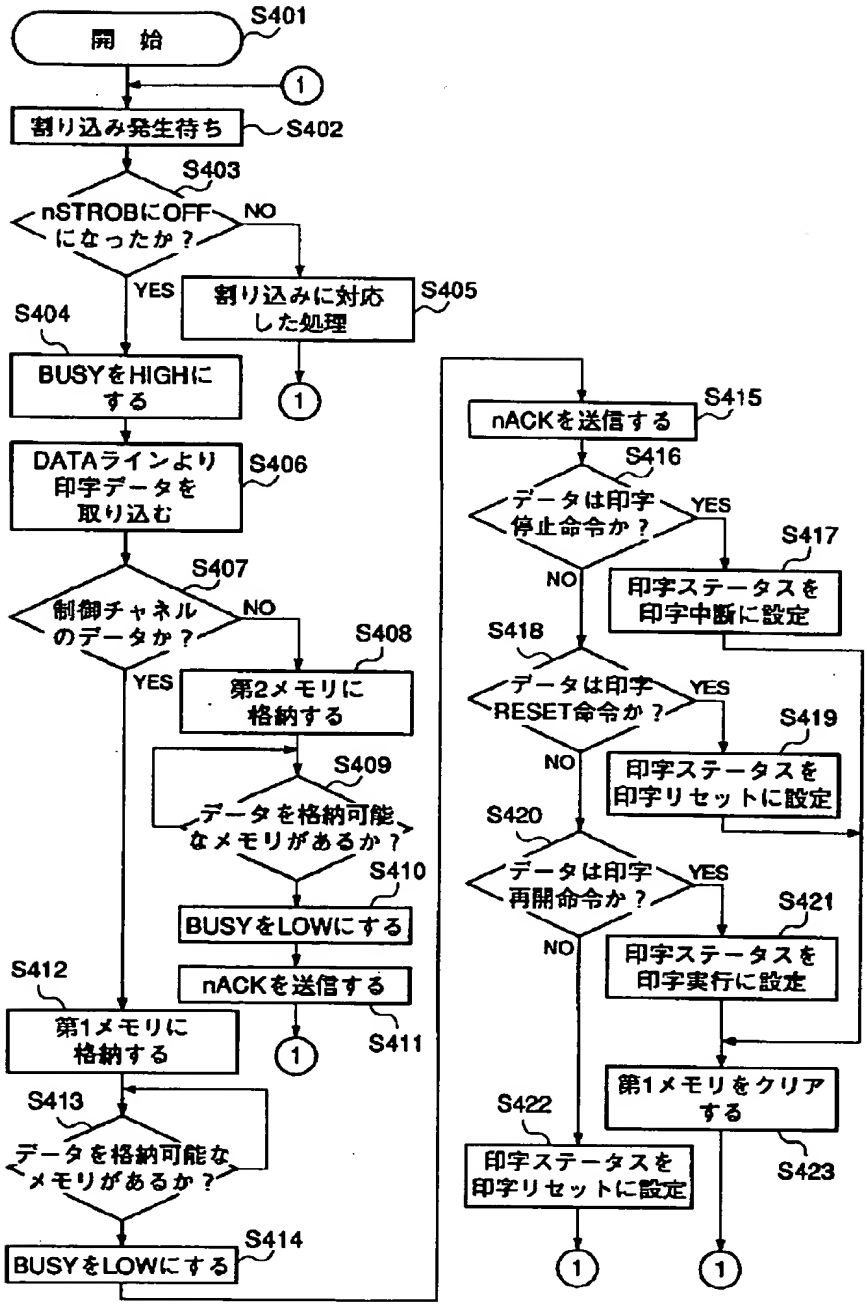
【図６】


ユーザーによる割り込み発生
S201
割り込み要因を取得
S202
送信状態FLG=WAIT？
S203
YES
NO
プリンタに対して制御チャネル開始識別子を送出
S207
割り込み要因は印字中断か？
S211
YES
NO
S214
プリンタに対して印字停止命令を送出
割り込み要因は印字中断か？
S204
YES
NO
S208
送信状態FLGをSTOPに設定
割り込み要因は印字再開か？
S212
YES
NO
S215
プリンタに対して印字再開命令を送出
割り込み要因は印字再開か？
S205
YES
NO
S209
送信状態FLGをCONTINUEに設定
割り込み要因は印字中止か？
S213
YES
NO
S216
プリンタに対して印字停止命令を送出
プリンタに対して印字データRESET命令を送出
S217
割り込み要因は印字中止か？
S206
YES
NO
S210
送信状態FLGをDISCARDに設定
プリンタに対して制御チャネル終了識別子を送出
S218
終了
S219

【図７】


開　始
S301
プリンタを
リセットする
S302
印字ステータス
を実行に設定
S303
メモリに未印字
の印字すべきデータ
があるか？
S304
NO
YES
S305
印字ステータス
が印字実行か？
NO
YES
S309
印字ステータス
が印字リセットか？
NO
YES
S313
印字ステータス
が印字中断か？
YES
NO
S310
メモリ上の印字
データをすべて破棄
プリンタを
リセットする
S311
印字ステータスを
実行に設定
S312
次の印字すべき
ページの印字処理を
実行する
S306
印字処理の排紙を
確認
S307
印字処理が終了した
データをメモリから
削除
S308
S314
プリンタを
リセットする
S315
印字ステータス
を実行に設定

【図８】


開　始
S401
割り込み発生待ち
S402
nSTROBにOFFになったか？
S403
NO
YES
割り込みに対応した処理
S405
BUSYをHIGHにする
S404
DATAラインより印字データを取り込む
S406
制御チャネルのデータか？
S407
NO
YES
第2メモリに格納する
S408
データを格納可能なメモリがあるか？
S409
BUSYをLOWにする
S410
nACKを送信する
S411
第1メモリに格納する
S412
データを格納可能なメモリがあるか？
S413
BUSYをLOWにする
S414
nACKを送信する
S415
データは印字停止命令か？
S416
YES
NO
印字ステータスを印字中断に設定
S417
データは印字RESET命令か？
S418
YES
NO
印字ステータスを印字リセットに設定
S419
データは印字再開命令か？
S420
YES
NO
印字ステータスを印字実行に設定
S421
第1メモリをクリアする
S423
印字ステータスを印字リセットに設定
S422
1

【図９】

セントロニクス線　プリンターベンダーに開放されている
コントロールバイトの利用

例1

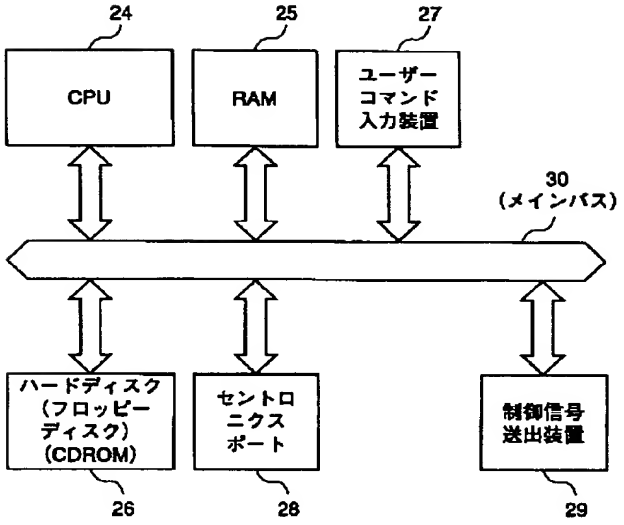
命令　BIT番号	5	6	7
印刷中断命令	ON	-	-
印刷再開命令	-	ON	-
印刷中止命令	-	-	ON

例2

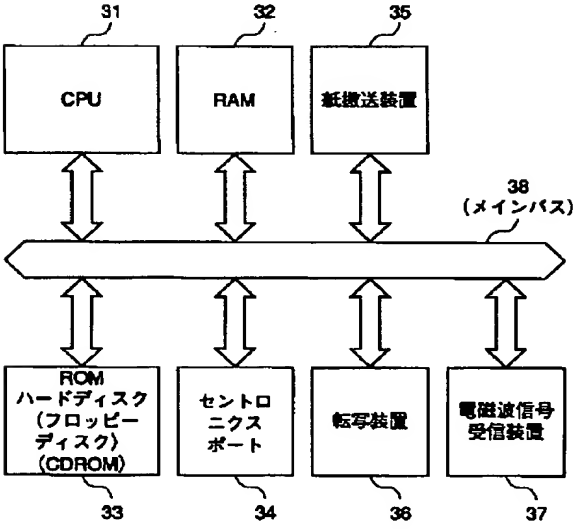
命令　BIT番号	5	6	7
印刷中断命令	OFF	-	-
印刷再開命令	ON	-	-
印刷中止命令	-	ON	-

(-.... DONT CARE)

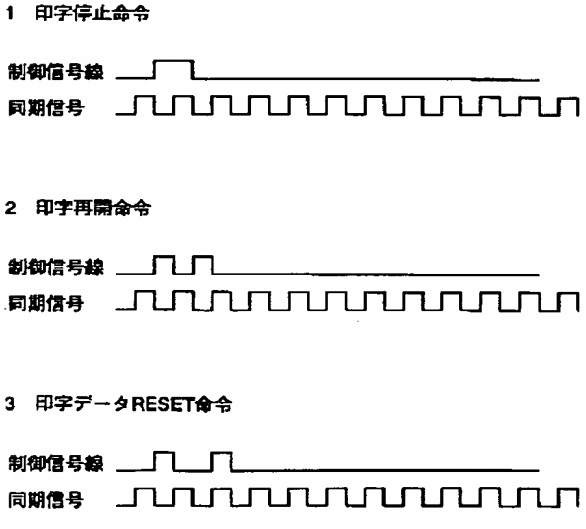
【図１０】



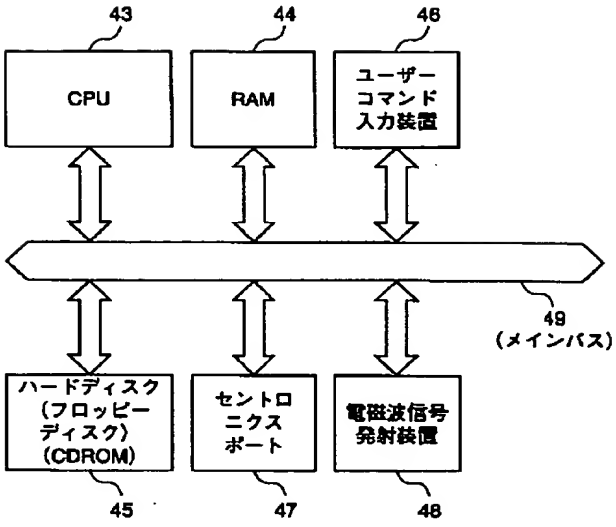
【図１１】



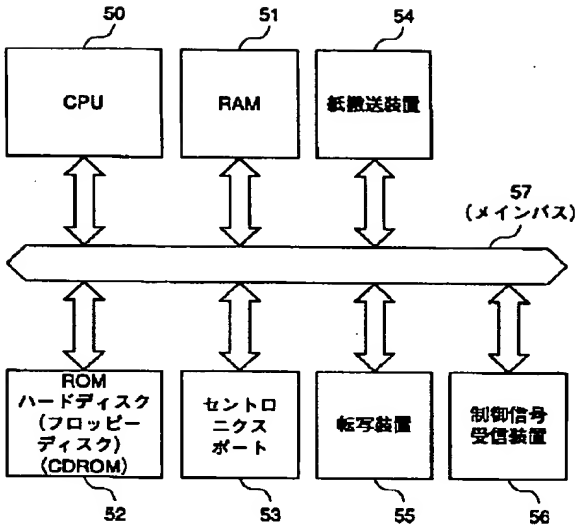
【図１３】



【図１４】


43
44
46
CPU
RAM
ユーザー
コマンド
入力装置
49
(メインバス)
ハードディスク
(フロッピー
ディスク)
(CDROM)
セントロ
ニクス
ポート
電磁波信号
発射装置
45
47
48

【図１５】


50
51
54
CPU
RAM
紙搬送装置
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(メインバス)
ROM
ハードディスク
(フロッピー
ディスク)
(CDROM)
セントロ
ニクス
ポート
転写装置
制御信号
受信装置
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